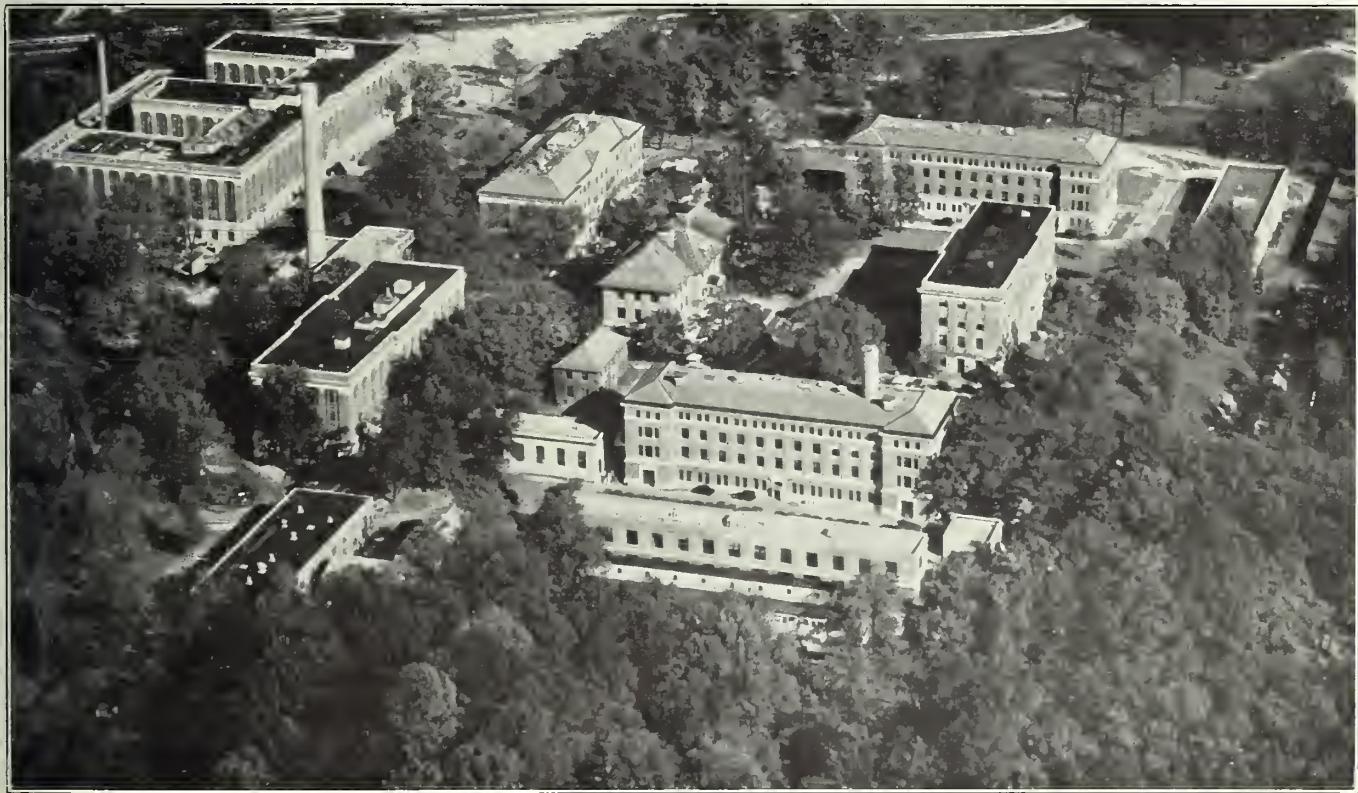


# COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in  
Commercial Standardization and Simplification*



AIRPLANE VIEW OF NATIONAL BUREAU OF STANDARDS

ISSUED BY THE NATIONAL BUREAU OF STANDARDS OF THE  
UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D.C., U.S.A.

Vol. 6, No. 5



NOVEMBER, 1929

# UNITED STATES DEPARTMENT OF COMMERCE

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## DIVISIONS OF THE COMMERCIAL STANDARDIZATION GROUP

### DIVISION OF SIMPLIFIED PRACTICE, EDWIN W. ELY.

The division of simplified practice was formed in November, 1921, to provide a clearing house or centralizing agency through which the manufacturer, distributor, and consumer groups could meet to discuss their common problems and decide upon eliminations which would prove of mutual benefit to all concerned. The activities of the division are purely cooperative in character. It orders nothing; it dictates nothing; the initiative must come from business itself. It has no regulatory nor police powers to enforce adherence to the simplified-practice recommendations that industry develops under the auspices of the United States Department of Commerce. Its chief function is to serve as a neutral meeting ground for the purpose of bringing together producers, distributors, and consumers, whose aims are sometimes divergent and possibly antagonistic, and who would be unwilling to cooperate, except through some unbiased central agency. Following the approval of the tentative simplified-practice recommendation by a general conference of all interested elements thereof, the project is then presented to the entire industry by letter referendum for its approval and written acceptance, the publication and indorsement of the recommendation on the part of the Department of Commerce being dependent upon acceptance of the program by at least 80 per cent, by volume, of the manufacturers, distributors, and users concerned.

### AMERICAN MARINE STANDARDS COM'TEE, A.V. BOUILLON.

The American Marine Standards Committee was organized to promote simplification of practice and elimination of waste in the marine and allied industries. It is composed of individuals, corporations, societies, Government departments, public bodies, or other organizations or groups engaged in building or operating ships, port facilities, and related activities. It works in close cooperation with official agencies, but its activities are controlled by an executive board elected annually by and from the membership. For further information, write direct to the secretary, A. V. Bouillon, Room 713, Department of Commerce, Washington, D. C.

### DIVISION OF TRADE STANDARDS, I. J. FAIRCHILD.

The commercial standards unit, now known as division of trade standards, was created on October 1, 1927, for the purpose of aiding those industrial and commercial groups desiring to establish standards of grades, quality, or measurements for their products or their purchases on a purely voluntary basis.

The division functions only at the direct request of the industry concerned. Its procedure is similar to that of the division of simplified practice, except that at least 65 per cent of the industry, by volume of annual production, must accept the commercial standard in writing before it is published by the Department of Commerce. A certification plan is applied

### DIVISION OF TRADE STANDARDS—Continued.

on request as a means of increasing the effectiveness of such standards. Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

### DIVISION OF SPECIFICATIONS, A. S. McALLISTER.

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. The cooperation with technical societies and trade associations includes ascertaining the standardization and specification promoting activities of these organizations, and bringing to their attention the work being done by the commercial standardization group. The cooperation with producers involves the compilation of lists of manufacturers who have expressed their willingness to certify to purchasers, upon request, that material supplied by them on contracts based on certain Federal specifications or commercial standards comply with the requirements thereof. The division prepares the directories of governmental and nongovernmental testing laboratories; the Directory of Specifications; and is working on an encyclopedia of specifications, the first volume of which, Standards and Specifications in the Wood-Using Industries, has been issued. It also aids in preparing the Standards Yearbook.

### BUILDING AND HOUSING DIVISION, J. S. TAYLOR.

The division of building and housing cooperates with business, technical, and professional groups in practically all its undertakings on building and housing. Its work to modernize building codes and to encourage improved standards for the quality of building construction promotes the practical application of the latest development in design and use of building materials. This division was also formed in 1921.

In furthering home ownership, an effort is made to develop an enlarged, steadier, more intelligent, and more discriminating demand for soundly built dwellings, the largest single class of buildings which the construction industries provide. The division also cooperates with many business and professional groups in efforts to distribute building activity more evenly throughout the year, and to secure less fluctuation from year to year. The work on city planning and zoning has in mind the broad objective of buildings made more useful because well located with respect to other buildings, a well-coordinated street system, and appropriate public works. Good city planning and zoning likewise encourages stability in land values and property uses, and thereby contributes to the demand for durable structures.

Except where otherwise indicated, for further information address

## BUREAU OF STANDARDS

WASHINGTON, D. C.

# COMMERCIAL STANDARDS MONTHLY

*A Review of Progress in  
Commercial Standardization and Simplification*

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# THE DIVISION OF TRADE STANDARDS

*Its Function and Service to Business*

THE function of the division of trade standards is fourfold: First, to provide a neutral agency which will insure adequate consideration of the needs of all interests; second, to supply such assistance and advice in the development of a commercial standard program as past experience with similar programs may suggest; third, to solicit and record the extent of adoption and adherence to the standard; and fourth, to add all possible prestige to such standardization movement by publication and promulgation of the commercial standard if and when it is adopted and accepted by all elements directly concerned.

Commercial standards are restricted to commodities which are bought and sold and do not conflict with the standards of engineering societies or other organizations, but incorporate their recommendations wherever possible.

The work of the division of trade standards is designed as a service to business. It is mainly promotional in character, and its chief mission is to get behind standards of unusual merit or utility and foster their wider use. The service is available to any industry, without cost, upon written request to the National Bureau of Standards. The standards are developed according to a simple procedure requiring the cooperation of all elements of an industry—producers, distributors, and consumers. Following a satisfactory majority of written acceptances the commercial standards are published and distributed to the trade.

One of the main features of the service is the certification and labeling plan which facilitates for the small as well as the large purchaser, the specification method of buying and makes it effective as far as practicable without constant resort to tests.



## LESS VARIETY—MORE SALES

### How the Production Department of the Manufacturing Plant Helps to Increase Sales Through Simplification

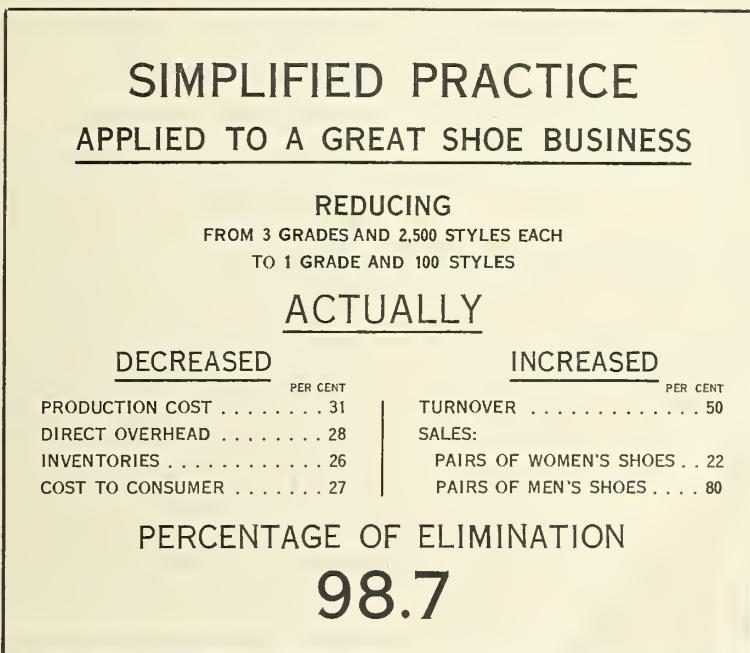
RAY M. HUDSON, Assistant Director National Bureau of Standards

Victory in to-day's battle for a larger slice of the consumer's dollar hinges on the teamwork of two men—the sales manager and the factory manager. No matter how much these men have differed in the past as to the one best way to attain their common objective of maximum volume, they are to-day more closely allied or united under the pressure of current conditions.

Keen competition, price cutting, and rising costs of doing business are pushing profit margins down. Consumer resistance to higher prices checks any effort to maintain former profits through price advances. Reduction of production costs through wage cuts

trating their manufacturing and selling efforts on a consistent minimum variety of line numbers. Simplification, rather than diversification, is the avenue they have chosen to increased sales and better profits. Often a wide variety is utterly useless as a sales stimulus, as in the case of utilitarian articles where differentiation is necessary, variations can often be most successfully introduced in the types left after simplifying the line.

A western manufacturer of sweaters and many other varieties of knit goods offered his products to the trade in a wide assortment of types, styles, models, and color combinations, and each in the customary



*Sometimes a wide variety of styles is a detriment. This shoe company increased sales through simplification*

reduces purchasing power and renders consumers less able to buy. How then can profits be assured?

#### Sales efforts.

The common answer seems to be, "Sell enough more units to offset the shrinkage in profits caused by the smaller margin per unit." In some instances, efforts toward this end have resulted in adding more numbers to the line and more salesmen to the field forces. The effect has been not only to increase the cost of securing the order but also of filling it. Increased selling and manufacturing costs have in some cases wiped out the profits anticipated from the larger sales.

In contrast to these instances are those wherein sales managers and factory managers have cooperated in cutting down their product lines, and in concen-

range of sizes. In 1922, his output averaged 1,503 garments per operator, his share of the swimming-suit output of the United States was one-fourth of 1 per cent. His market consisted of 11 western States.

This manufacturer decided to condense his line to swimming-suits only. He offers these in 17 styles, 11 color combinations, and 13 sizes, all fast-turning numbers. In 1926, his output averaged 2,715 garments per operator, his share of the total swimming-suit output for the United States rose to 12½ per cent, and his market included all of the 48 States and 40 foreign countries. Simplification and a world-wide advertising and selling campaign did the job.

A company specializing in fur goods simplified its line to one type of fur. Results: Concentrated production, improved quality, and enhanced advertising possibilities. In four years, the output of this com-

pany's dyeing works increased from 100,000 to 1,000,000 skins annually, or 900 per cent.

#### Drug industry.

A drug manufacturer back in 1916 had 2,670 items in his catalogue. In 1924 his catalogue listed 144, an elimination of 95 per cent. Results: Business increased 400 per cent, the trade got lower prices, the employees better pay and steadier work, the company handled four times the original volume of business in less space, tablet stamping machines operated continuously without change of dies, the cost of boxes for packing the tablets was cut 85 per cent, and the firm made larger profits.

A well-known manufacturer of men's hats found 90 per cent of his business came from seven styles in 10 colors, though he was offering more than 3,700 varieties of hats to his trade. A drastic elimination enabled him to cut his raw material inventory from \$500,000 to \$176,000. His business rose from \$1,600,000 a year to \$4,000,000.

A nationally known cigar company reduced its brands from 152 to 5, or 97 per cent. Sales increased in five years 42 and 53 per cent, respectively, on its two foremost brands. Sales and advertising costs dropped from 5.44 to 1.80 per cent of gross sales, a reduction of 67 per cent. Simplification and a nationwide advertising and selling campaign did the job.

A manufacturer of rubber goods cut his catalogue from 1,600 to 6 items and in eight years increased his total sales 800 per cent.

Another company started operations in 1897 with one product, a facial cream. At the end of 20 years its line ranged from 2,500 to 5,000 items. Analysis of sales indicated a preference for a certain item. The company simplified its line to six varieties or styles of that item. To-day the salesman takes the entire line under his arm and displays it to 10 dealers in the same time formerly required to show the old line to one dealer in a hotel sample room.

A men's ready-to-wear clothing manufacturer offering 1,000 varieties of suits to his trade simplified his line to 24. By so doing, his overhead per garment cut dropped 50 per cent; his production period increased from 36 to 52 weeks. His salesmen were on the road 12 months instead of 4; they increased their retail agencies from 150 to 1,000. Yearly sales increased from 30,000 to 60,000 suits. Selling cost decreased 35 per cent, and manufacturing cost 25 per cent.

Many other examples might be cited of increased sales for individual concerns that have applied simplification, but space limits forbid. However, examples like these have influenced groups of manufacturers, entire industries in fact, to simplify their lines as a means of increasing sales, decreasing costs, and meeting the "new" or interindustry competition.

#### Nation-wide scope of simplification.

Through the cooperative services afforded American industry by the division of simplified practice of the National Bureau of Standards, a total of 114 different simplifications have been effected. These range from the reduction of paving bricks from 66 to 5 varieties, to the reduction of varieties of grinding wheels from 715,200 to 254,400.

Taking as one example the reduction of variety in files and rasps from 1,351 to 475, letters received by the division of simplified practice from firms partici-

pating in this simplification demonstrate the values of simplification as a sales builder.

"Since we have accepted the simplified practice recommendation of your department we have increased the volume of our business 33.3 per cent and reduced the volume of our inventory 25 per cent. This necessarily means a quicker turnover, less dead products, and quicker deliveries to our customers. With the smaller variety we can anticipate their wants more accurately and keep better control of our own production. We feel no hesitation in saying that the elimination of the slow-selling items which we were generally correspondingly slow in shipping and the consequent better service we are rendering our customers have helped to increase our sales. The reduction in total inventory in spite of the increase in sales has released capital which we have been able to spend to advantage in improved equipment.

"Since 1922 our sales on files have increased 100 per cent. Our profits have increased from 14 to 25 per cent, and our inventory ending December 31, 1927, as compared to our volume of sales, has decreased 10 per cent over our inventory of December 31, 1922. During the year 1926 orders and shipments for files and rasps not included in the regular program amounted to 1 per cent."

#### Simplification of die head.

A manufacturer of self-opening die heads says: "We have found that simplification has given to us a sales increase of 23.5 per cent and an inventory reduction of 35 per cent. It has reduced our investment in dies, etc. It gives us larger runs for each change of dies. With larger runs of standard items we find that even our detail clerical work is reduced, because we have less stock records to maintain on both raw and finished material."

A manufacturer of concrete blocks says: "By following the suggestions in regard to concrete blocks—reducing patterns—I have been able to reduce the stock I have to carry more than 60 per cent, and have actually increased my sales of the standard pattern and size 15 per cent. By doing this my block business shows a satisfactory profit, whereas before the excessive stock ate up all the profit."

Another says: "The net result being, that we have reduced our selling price on our units, still making a fair profit, thereby selling more units, and creating a larger demand for our products. The simplified practice in our plant has reduced the selling price of our product 25 per cent."

A bed blanket manufacturer says: "At the beginning of this year, we cut down the sizes and styles carried in our blanket and comfort department about 40 per cent from what we carried during the year 1926. The result: That in spite of a 40 per cent simplification of the blanket and comfort department we increased our sales approximately 7 per cent."

#### Application to merchandising.

Increasing recognition of simplification as a means to greater sales is shown in its adoption in merchandising.

A well-known eastern wholesaler of hardware who carried more than 10,000 items in his stocks cut them to 7,000. At the same time he cut out 28 per cent of the territory and 56 per cent of the customers he had been trying to serve, for the reason that these eliminations represented unprofitable business. A

slight decrease in gross sales occurred, but the volume of net profits increased 35 per cent in three years, and his percentage of "net" to "sales" increased 68 per cent.

A chain of drug stores so large it buys entire factory outputs cut its average store stock from 22,000 to 10,000 items, increased its turnover 70 per cent, its volume of business 43 per cent, and its wage rates 100 per cent. It decreased the average store investment 14 per cent, the inventory time 67 per cent, the cost of taking inventory 56 per cent, and the store personnel 58 per cent. Pay-roll cost dropped from 20 to 11 per cent of sales and rent from 14 to 7 per cent of sales.

The president of a great chain of 5-and-10-cent stores that likewise purchases complete factory output says: "Any store that maintains a good rate of turnover can always get a fair merchandising profit, regardless of price trend. One of the best ways to attain a high turnover is to eliminate unnecessary duplication."

Application of this theory reduced his brands of talcum powder from 32 to 6, his varieties of screw drivers from 26 to 6. Similar eliminations were made in hundreds of other lines. Results: Annual turnover increased from 5.5 to 9.25, capital invested in stocks was reduced 50 per cent. Stock in this company has a current market value around \$200 a share. Simplification, skillful merchandising, and courageous management spell profits and dividends in this case.

Purchasers are also finding simplification valuable to them. An eastern railroad cut its stores stock from 52,000 to 32,000 and its inventory from \$3,320,000 to \$805,000. Another reduced its stocks from 140,000 items to 78,000, a 44 per cent elimination, and by so doing released nearly \$40,000,000 of idle capital.

This steadily growing appreciation by merchants and other large purchasers of the usefulness of simplification to them is an effective antidote to some kinds of high-pressure selling efforts, especially those which tend to overload the buyer. Studies have shown

that 80 per cent of the business for a firm, corporation, or an industry is usually done in 20 per cent of the varieties of its products or lines. The other four-fifths of the variety which brings in only one-fifth of the year's business is the breeding ground for all kinds of problems, from too high a frequency of changes in machine "set-ups" in the factory to increased selling cost on the road.

Often, sales managers in their eagerness to supply what the public wants, or at least, what it will buy, fear that any curtailment of variety in their products will reduce sales. They fear a condition of "over-standardization"—a line with no "sales appeal."

On the other hand, factory managers fear "over-diversification." Too many varieties, too many changes in color, style, or design interfere with low unit production cost. Purchasing problems are complicated, stocks multiply, inventories increase. Simplification offers an excellent basis of compromise between the "factory" and the "sales" viewpoints. It affords an opportunity to reduce variety to the point where it permits fair economy in production and yet retain sufficient variety to satisfy the bulk of consumer demand.

It must be recognized that profits of a business are not earned by the sales department alone on sales, nor by any single department. They are saved. The purchasing department doesn't earn profits, but it may save them. So with the credit and all other so-called nonproductive departments. The factory plans many savings in its efforts to get out the product, but unwarranted insistence by the sales department on too much variety in the line may absorb all the savings.

Therefore increased sales as the road to increase profits begin with greater recognition of the interdependence of the sales and the factory managers, each on the other. Out of this recognition comes that common bond of mutual interest, teamwork, and co-operation that spells bigger and better results for both.

## FULL DISK BUFFS SIMPLIFIED

### Conference Reduces 17 Different Diameters to 11 Standard Sizes

A general conference of representatives of manufacturers, distributors, and users of buffing wheels last month approved a simplified practice recommendation, in which the 4, 5, 6, 7, 8, 11, 13, 14, 17, 18, and 20 inch full disk buffing wheels were selected as standards for stock items.

The action of this conference resulted in a reduction from 17 different diameters to 11 standard sizes as indicated above, corresponding to an elimination of 35 per cent of needless varieties. The conference also voted that 20 ply should be adopted as the standard ply for stock buffs. The recommendation is to become effective on January 2, 1930, for production on the new schedule and January 2, 1931, for the elimination of current stocks of nonstandard sizes.

The appointment of a standing committee was authorized to consist of the following representatives:

*Manufacturers of buffs.*—B. H. Divine, president, Divine Brothers Co., Utica, N. Y.; Floyd T. Taylor,

vice president, Hanson-Van Winkle-Munning Co., Matawan, N. J.; and E. Winthrop Hall, of the F. L. and J. C. Codman Co., Boston, Mass.

*Users of buffs.*—One representative each from the General Motors Corporation, the Western Electric Co., and the Seovill Manufacturing Co.

*Distributors of buffs.*—A representative of F. B. Stevens Co., Detroit, Mich.; and Crown Rheostat & Supply Co., of Chicago.

*Textile manufacturers.*—A representative of the Cotton Textile Institute.

*Machinery builders.*—A representative of the United States Electrical Tool Co., Philadelphia, Pa.

It was the combined opinion of the conferees that the adoption of the above diameters as standards would greatly reduce the wasteful cutting of sheeting out of which buffs are made and at the same time reduce the cost of production and distribution. The standing committee is to give further attention to the possibilities for standardization of sewing, arbor holes, and pieced buffs.

It was the opinion of the conference that the standing committee should also give consideration to the standardization of polishing wheels.

## STANDARDIZED FEDERAL PURCHASING

**Board Formed in 1921 Under Supervision of Chief Coordinator to Coordinate Federal Purchasing, Says Writer; Has Four Standing Committees; One Committee, That for Commodities, Has Eight Subcommittees**

By J. A. EGLESTON (*Merchant Fleet Corporation*), *Executive Vice Chairman and Secretary, Federal Purchasing Board*

By direction of the President, the Federal Purchasing Board was organized under authority of Circular No. 25, Bureau of the Budget, dated August 25, 1921, to enable the chief coordinator to perform the duties of coordinating purchases throughout the several Federal departments and establishments. Each department and establishment having authority to purchase materials and supplies designates one representative to membership on this board.

The function of this board is to formulate policies and plans to unit the purchasing activities of the several departments and establishments in such manner as to bring about business methods calculated effectively to safeguard the interests of the Government, and at the same time promote the confidence of private business interests in their contractual relations with the Government as a buyer.

### **Board meets once a month.**

The Federal Purchasing Board meets once each month for the purpose of taking up new subjects for consideration and of receiving reports and recommendations from its committees on various subjects having previously been taken under consideration. All action taken by the board is in the nature of a recommendation to the chief coordinator who is chairman, and it is given effect only with his approval. In actual operation, however, the board functions under the immediate supervision of the executive chairman, N. F. Harriman, assistant to the Chief Coordinator, assigned from the Department of Commerce, and J. A. Egleston, assistant to the Chief Coordinator.

There are four standing committees of the Federal Purchasing Board. They are: The committee on operations, the committee on relations, the committee on commodities, and the committee on services. Each member of the board is a member or chairman of at least one of these committees. To the committee on operations are generally referred all matters pertaining to plans, purchase principles, purchase laws and regulations—present and proposed, decisions, definitions, organization, procedure, personnel, equipment, offices, supplies, and blank forms. The committee on relations is generally given subjects involving requirements, specifications, deliveries, inspections, storage, disbursements, mailing lists, and eligibility of suppliers—present, proposed, and debarred. The preparation and promulgation of Federal specifications are, however, handled by the Federal Specifications Board, another of the activities comprising the Federal coordinating service.

### **The largest committee.**

The committee on commodities, the largest in personnel, and about which more will be said further

on, has as its prime function that of conducting procurement studies and formulating recommendations as to purchase methods for inclusion in an appropriate section of the Federal Standard Stock Catalogue, being prepared under the jurisdiction of the Federal Standard Stock Catalogue Board, another agency in the Federal coordinating service. These studies also involve the collection of data pertaining to the availability of commodities and to the several phases of market conditions as of vital importance in the determination of purchase plans. Kindred subjects relating to specific commodities are also referred to this committee. To the committee on services are generally referred subjects relating to the procurement of transportation and such services as communication, power, light, and miscellaneous personal services.

### **Committee has eight members and chairman.**

In organizing the committee on commodities, because of the huge task which it has undertaken, it consists of eight members and a chairman—each a member of the Federal purchasing board. Each member is, in turn, a chairman of one of eight subcommittees. These subcommittees have two other members who are not members of the Federal Purchasing Board—they being especially designated by the departments and establishments in addition to their respective representatives on the board—and in each instance one member is designated by the Department of Commerce in recognition of the valuable data on market conditions available in the Bureau of Foreign and Domestic Commerce of the department.

Each of the subcommittees supervises the work carried on by a number of advisory groups, which consists of about four or five persons experienced in actual procurement—not members of the board—designated by the departments and establishments because of their intimate knowledge in the purchase of certain lines of materials and supplies. Each advisory group elects its own chairman from its personnel.

### **Subcommittees described.**

The eight subcommittees—more or less arbitrarily so designated—and the respective advisory groups under their supervision corresponding to groups for procurement representing groupings of commodities as found in productive industry and as prescribed in the Federal Standard Stock Catalogue, are as follows:

*Subcommittee No. 1, chemicals.*—L, cellulose and products; O, chemicals; P, cleaning and polishing materials; U, drugs and medicines; X, explosives; BB, gases; TT, paints, pigments, varnishes, and products.

*Subcommittee No. 2, farm products.*—B, animals; C, animal products; N, cereals and products; Y, fruits; Z, fruit products; EE, groceries; LL, livestock, poultry, and marine products; PP, meats and sea foods;

EEE, tobacco and products; HHH, vegetables; JJJ, vegetable products.

*Subcommittee No. 3, machinery.*—A, aircraft, boats, and ships; D, arms (small); E, artillery; F, boilers, engines, and tanks; S, cooking and heating apparatus, furnaces, and ovens (nonelectric); GG, instruments; OO, machinery; WW, pipe, pipe fittings, plumbing, fixtures, tubes, and tubing (metallic); XX, pumps; AAA, scales; GGG, tools; KKK, vehicles.

*Subcommittee No. 4, miscellaneous.*—G, books and printed matter; H, brooms and brushes; KK, leather and leather goods; UU, paper and products; YY, recreational articles; ZZ, rubber and rubber goods; FFF, toilet articles.

*Subcommittee No. 5, electrical.*—J, cable and wire (insulated); W, electric apparatus; CC, generators and motors; HH, insulating materials.

*Subcommittee No. 6, textiles.*—K, canvas articles; T, cordage, twine, and products; V, dry goods and notions; JJ, knit goods, netting, and webbing; BBB, suits and uniforms; CCC, textiles (yardage); DD, textile products.

*Subcommittee No. 7, building materials.*—M, ceramics; AA, furniture; DD, glass and glassware; FF, hardware; MM, lumber and timber; NN, lumber products; RR, metal products; LLL, wood products.

*Subcommittee No. 8, fuels and minerals.*—Q, coal and products; R, coal tar and products; QQ, metals; SS, minerals and products (nonmetallic); VV, petroleum and products.

Generally, these advisory groups meet the first week in each month, the subcommittees meet during the second week, the committee on commodities during the third week, thus affording a progressive submission and approval of recommended purchase methods and an opportunity for consideration first by experts in related commodities and secondly by those especially familiar with action taken on commodities in other lines of industry.

#### Commodities subdivided into divisions.

The commodities comprising each group for procurement—a term designed to classify together for advantageous procurement articles originating in a major line of industry—are further subdivided into divisions representing specialized production within a given major productive industry. It is the duty of each advisory group to formulate purchase methods—division by division—designed to coordinate the procurement of the articles in such way as to bring to the Government as a whole the greatest possible benefits, and yet without disruption to the organization of the various departmental purchasing agencies and without depriving the interested departments and establishments of their right to administer the expenditure of funds appropriated for the procurement of material.

In the determination of advantageous procurement methods—to be promulgated by the Chief Coordinator through the medium of the Federal Standard Stock Catalogue—each advisory group first ascertains the purchasing practices already in effect. In this it is necessary to know such facts, as the period and types of contracts, the location of requirements, location of purchasing officers, frequency of purchase, terms of delivery, inspection arrangements, quantities used, and related factors.

#### Conducts research regarding availability of commodities.

Coincident with this is conducted a research as to the availability of the commodities, ascertaining such facts as number and location of sources of supply, variations in practice of production and marketing, nature and extent of competition, price trends, seasons of production, and other data pertaining to the production and commercial distribution of the articles.

With a clear picture of the needs of the Government and of the availability of a given commodity under normal conditions, the advisory group is in position to formulate a general method of purchase contemplated to not only afford the Government every consistent advantage, but to also attract the widest possible commercial interest from the standpoint of production, distribution, and sale.

#### Quantity buying means lower prices.

While, in general, it follows that quantity buying attracts lower prices and proportionately lower inspection costs per unit, consideration must be given not only to the extent to which suitable storage exists in advantageous locations, but also of prime importance is the necessity of avoiding the consolidation of quantities into totals too large to attract individual producers or distributors. For there is a maximum demand which, if exceeded, can not readily be met by a single competitor and the buyer is forced to pay a premium either in time of delivery or price, if not in quality.

Broadly speaking, three basic principles of consolidating requirements are observed—local, sectional, and national. Local consolidation is feasible when there is ample local production and competition, as is often the case in buying gasoline. Sectional consolidation involves such commodities as coal which is produced in certain well-defined localities and normally finds its way into long-established markets. National consolidation will be rarely effected, for it would be influenced first by a limited number of sources, but frequently ample competition would not be available.

#### Elimination of waste.

In this procurement of governmental requirements, while due consideration must be given to occasional needs of a nature peculiar to special work in which certain activities are engaged, nevertheless the Federal Purchasing Board has adopted in principle, the movement for elimination of waste, as carried on by the National Bureau of Standards and promulgated through simplified practice recommendations and commercial standards. The Federal Purchasing Board is also committed to the policy of standardization of specifications and its executive chairman is an ex officio member of the Federal Specifications Board. Somewhat related to specifications, though not within the purview of the Federal Specifications Board, is the function of inspection and testing and with the view to using available facilities to the fullest extent and at the same time reduce the proportion of inspection per unit of purchase, the Federal Purchasing Board has adopted the policy of single inspection under joint procurement.

It is, therefore, evident that the Federal Purchasing Board is essentially a participant in the general plan

of standardization, for in addition to advocating and practicing standardization in commodities and blank forms used in procurement, it is actually engaged in standardizing the methods of procurement which now vary in many instances.

#### Navy uses hack-saw blades.

An instance worthy of mention, illustrating the motive for consolidation and the nature of consolidation actually effected, is found in the procurement of hack-saw blades, the Navy Department probably being the largest user. The Federal specification provides for the determination and rating of work values to be considered along with bid prices in determining that award which will give the greatest amount of service per dollar expended. The Navy Department was in a position to apply this principle by virtue of having already developed and used such a method of

considering performance and sale value. To avoid duplication of mechanical facilities and effort, as also confusion from several independent series of tests of like products, the Federal Purchasing Board recommended and obtained approval of the plan now followed, under which semiannual consolidated purchases of definite quantities are made by the Navy Department from forecasts of requirements submitted by all activities, and stock is maintained from which delivery is accomplished as early as could be under individual purchases of small quantities at irregular times or under running contracts for indefinite quantities.

The benefit from quantity buying is available to all, in addition to the saving of effort and confusion that would follow if each buying activity were to conduct these performance tests and establish its own numerically expressed work values.

#### MOTOR COMPANY FINDS MANY USES FOR SCRAP

**Sales of Scrap Amounted to \$3,573,877.60 for 1928; One of the Largest Items Is That of Imitation Leather; Left-Over Cuttings from Wool Upholstery Cloth Made into Polishers for Eyeglasses**

"Sales of scrap by a prominent automobile company during 1928 amounted to \$3,573,877.60," says a writer in a recent issue of the magazine, Michigan Manufacturer and Financial Record, "except for coke, the largest single item in the report of the by-products sales department for last year. The figure represented only such scrap as was sold; large quantities were salvaged and converted back into use by the company itself. The economies that have been effected through this phase of the company's activities are unusual."

"The biggest single item of scrap that is sold is the steel turnings from the machine shops; about 15 carloads, or 500 tons, are sold daily to outside mills. The quantity is too great to be absorbed by any one mill, so it is distributed among several which use it in the manufacture of new steel."

"Second in quantity are the trimmings from the sheet metal stampings, of which about 10 carloads of bundles are produced in the rough plant each day. These are used entirely in open-hearth furnaces, and at times can all be consumed in the open-hearth at the rough plant without resort to outside sale."

"Third in volume are the drop-forged flashings which have been obtained from the manufacture of such parts as the camshaft. There are 3 carloads of these per day, or 125 tons; the scrap goes to the open hearth like that from the sheet-metal parts. Then there is the nonferrous scrap, such as brass clippings from the radiator department, copper scrap, and so on. These are used or sold back to the mills."

"Not all of the scrap comes from the production line. Some of the most unusual items come from other departments. There are bones from the commissaries—2,300 pounds a week—sold to soap companies. There is a carload of blotting paper each week which has served in the Triplex shatterproof glass department in the glass plant as a cushion for the glass, but has lost none of its value as blotting paper."

"One of the largest items is that of imitation leather and rubber scraps which are much sought after by novelty manufacturers. These are graded to size, packed separately in cartons, and sold in carload lots."

"The left-over cuttings from the wool upholstery cloth department are sold to an eastern optical firm to be made into polishers for eyeglasses."

#### NEW AERONAUTIC STANDARDS PROPOSED

**S. A. E. Recommends Several New Standards for Airplane Parts and Fittings**

"Many new standards for airplane parts and fittings were recommended at meetings of the aircraft division and aircraft-engine division of the Society of Automotive Engineers at the aeronautic meeting of the society recently held in Detroit," according to a news item appearing in the magazine Michigan Manufacturer and Financial Record, which said that "among the proposed standards are dimensions and load and inflation pressures of airplane tires, five types of valve for these tires, dimensions of seven tire rims of the drop-center type, dimensions of wheel hubs and axle ends, sizes of aircraft-engine spark plugs; dimensions of propeller hubs, shaft ends and propeller blade ends; tachometer drives, magneto mountings, and thermometer bulbs."

"The importance of standardizing upon a relatively few sizes and mountings for parts and fittings of airplanes before factories get into very large production is emphasized by the society, which points to savings calculated at not less than 15 per cent of the enormous total expenditure of the public for new automobiles annually that has been effected by standardization of automobile parts and fittings."

"Such standardization, it is pointed out, does not interfere with engineering advance and design improvement, as it does not attempt to standardize design. On the contrary, by reducing to a reasonable minimum the number of sizes of minor parts, economies in manufacture are effected that allow more money and time to be expended on research and development, and at the same time make possible reductions in selling prices. This results in increased sales and more rapid advance of the industry."

## CONFERENCE ON SCREW THREADS AND GAGES

**Joint Meeting of National Screw Thread Commission and American Gage Design Committee Reviews Several Proposed Changes in Standardization Programs**

A recent meeting of the National Screw Thread Commission and the American Gage Design Committee, held in Greenfield, Mass., considered several items pertaining to the work of the two organizations.

### **Tolerances on bolts and screw stock.**

The question of coordinating the tolerances on major diameter of certain sizes and classes of screws and bolts with steel manufacturers tolerances on hot-rolled stock was discussed. The evidence presented seemed to show that there is no necessity for such increase, since manufacturers are able to buy hot-rolled stock within present tolerances without extra cost, if they so specify in their orders. This applies to classes 1 and 2 in sizes where hot-rolled stock is commonly used.

Navy specifications for gas cylinder valves were presented for discussion, and a special committee was appointed to give the matter further study. Screw threads for acid drums were also referred to the same committee.

Following a discussion of proposed revision of certain bolt head and nut dimensions, it was voted to make certain changes in the five-eighths-inch bolt head and nut dimensions to bring them into conformity with the recommendations of the Bolt, Nut and Rivet Manufacturers' Association as approved by the sectional committee on bolt, nut, and rivet proportions.

The commission approved the recommendations of the American Gage Design Committee, covering gage blanks for reversible plug gages. Specifications for these blanks had not been completed at the time the remainder of the work of the American Gage Design Committee was approved by the commission.

### **Washer screws for water faucets.**

A sectional committee on standardization of plumbing equipment will take up the matter of standardizing the washer screws used in water faucets. A collection of the screws now in use were exhibited to the conference.

The conference discussed the gage classification as contained in the 1928 report. It has been held by some that only Class X gages are required by industry; the commission, however, believes that there is a need for class Y and Z gages, and took no action toward changing from the present classification.

The report of the sectional committee's subcommittee on slotted-head products was discussed, but the report has not been finally approved by the sectional committee.

The commission reaffirmed its attitude that it was not concerned with material, but only with dimensions of threaded products.

The secretary stated that three sections of the 1928 report are being published as separate reports for shop use. These abridged reports are as follows: (a) Regular coarse and fine thread series; (b) threads of special diameters, pitches, and lengths of engagement; (c) design of blanks for plain and thread plug and ring gages from 0.059 inch to 4.510 inches in diameter.

It was brought out in discussions that while there is still considerable use of nonstandard threads in automobile work, most of this is confined to old designs and replacements, and that practically all new work is strictly in accord with the American National Screw Thread Standards.

### **Thread-locking devices.**

While the commission has not gone into the question of thread-locking devices, it was stated to the conference that a comprehensive investigation is now being carried out at the National Bureau of Standards to determine the relative value of such devices, and that this investigation is being supported by manufacturers of threaded products.

It was stated that a subcommittee of the sectional committee on bolt, nut, and rivet proportions is working on the matter of socket-head cap and set screws.

## **SALVAGE LARGE FACTOR IN RAILROAD PROFITS**

**Worn-Out and Discarded Material Formerly Disposed of as Scrap; Modern Reclamation Plant Makes Savings**

"Before the advent of the modern reclamation plant, worn-out and discarded material was simply scrap and was disposed of as such," recently said Samuel A. Hayden, chief clerk to the general storekeeper, Missouri-Texas Railroad, in an article in the magazine Salvage.

"As one of the largest users of steel and iron products in the Nation," said the writer, "the accumulation and disposition of scrap was quickly recognized as a major problem, and the railroads naturally turned to reclamation as a profitable field of endeavor. While this phase of railroad work is in comparative infancy, intensive study of the possible savings

through reclamation has resulted in the saving of hundreds of dollars to the railroads within the past few years. No other phase of our work is worthy of more serious study to-day, and a concerted effort toward uniform reclamation practices is desirable.

"Not until an article has reached the stage where it can not be economically repaired or reclaimed should it be disposed of as scrap. Then it should be assorted and classified in such a way as to bring the greatest possible return to the property. Properly classified and assorted scrap commands premium prices, and with reasonable care, this classification can be accomplished with but little added expense. We should bend every effort to develop to its fullest extent the field of reclamation, as the dollars left in the treasury through the savings effected in this field will reflect to our credit on the general ledger of profitable operation of the property."

## BUILDING AND HOUSING SERVICES

**Division Formed in 1921 to Improve Housing Standards; Author Discusses Seasonal Operation in the Construction Industry; Building Practice and Home Builders' Problems; City Planning and Zoning, as Well as Their Points of Interest**

By JAMES S. TAYLOR, *Acting Chief, Division of Building and Housing, National Bureau of Standards, Department of Commerce*

The division of building and housing was established in the Department of Commerce in 1921, when the country had not yet recovered from the war-time housing shortage, and when there were, at the same time, millions of unemployed men walking the streets. That situation showed graphically how the country must depend upon an economical, smooth-functioning construction industry if housing standards are to be steadily improved, and if reasonable stability in business is to be achieved. Creation of the division was the culmination of efforts made during several years to have the Federal Government set up an agency which would work toward these ends.

### Committee formed in 1918.

A committee of the American Institute of Architects had recommended in 1918 that the National Bureau of Standards frame standard building code requirements that would serve as a guide for cities throughout the country. Several other of the present functions of the division were also contemplated in a bill introduced in 1919 by Congressman George H. Tinkham, of Massachusetts, providing for a Federal bureau of housing and living conditions.

The project was developed more nearly toward its final form by the Select Committee on Reconstruction and Production of the United States Senate, during the course of the hearings it held in many cities during the latter part of 1920. This committee in its report of March 2, 1921, definitely recommended the formation of a bureau or division of construction in the Department of Commerce. Bills providing for such a step were introduced in the House by Congressman Tinkham, and in the Senate by William M. Calder, of New York.

### Advocated by Hoover.

The idea that the Federal Government should cooperate on a voluntary basis with business and other groups in policies having the dual aim of relieving the housing shortage by means of new construction, and furnishing employment, had been publicly advocated by Herbert Hoover in November, 1920, and shortly after taking office as Secretary of Commerce in March, 1921, he announced such cooperation as one of the department's policies. He recommended an appropriation for the work, following the lines suggested by the Senate committee, and in the measures then pending before the two Houses of the Congress. This appropriation was granted in a bill passed in June, 1921.

An advisory committee on building codes consisting of nationally known architects and engineers was set up in the same month, and the division itself was established on July 1, with the general aim of aiding in the solution of such outstanding problems as stabil-

lizing building activity, more satisfactory development of urban areas through zoning and city planning, eliminating wastes in building, and encouraging home ownership.

### Seasonal operation in the construction industries.

In cooperation with a committee of the President's Conference on Unemployment, the division in 1923 and 1924 made an extensive survey of seasonal operation in the construction industries. The committee represented business and professional men, contractors, building material producers and dealers, building-trades labor, real estate men, bankers, engineers, and architects.

The study showed that construction usually reached a peak in the summer months, from which it receded as cold weather came on. As a consequence, workers in leading building trades, such as carpenters and bricklayers, were fully employed for only a few months, beginning about June or July, while contractors and material dealers were forced to adjust their business accordingly.

### Winter construction economical.

It was shown that the building season could be lengthened out into the spring and fall months, and, further, that construction in winter was both feasible and economical. Custom rather than climate appeared to be the reason for prevailing conditions. Subsequent studies by the division indicate that more and more construction is taking place in the winter months, with consequently steadier employment for building-trades workers. Customs which tend to throw the greater part of construction into certain months, such as the existence of a fixed leasing date, are being vigorously attacked in many cities.

### Municipal building and plumbing codes.

More than 850 local building and plumbing codes prescribe the conditions under which approximately three billion dollars' worth of building construction is carried out each year in the United States. These regulations are designed to assure structural safety in buildings and to reduce hazards to life and property, but they often require the use of excessive amounts of material, or fail to assure safety. Rapid development in design, better knowledge of the properties of materials as a result of research, and the development of new materials, or the adaptation of old materials to new uses, have made many existing provisions obsolete.

Individual cities are not equipped to do the extensive research necessary to put code requirements upon a completely scientific basis. The advisory committee on building codes, appointed by the Secretary of Commerce in 1921, and composed of engineers and

architects of national reputation, has completed six reports dealing with small-dwelling construction, plumbing, masonry walls, allowances for live loads in design, working stresses for timber, steel, concrete, and cast iron, and arrangement of building codes.

#### Bureau makes tests.

In many cases tests were undertaken at the Bureau of Standards to clear up doubtful points, and investigations of the actual performance of various materials under different circumstances in actual construction had to be made. A report on fire-resistive construction has recently been completed. Information relating to the more than 850 local building codes has also been compiled.

The general acceptance of the reports as authoritative is shown by the fact that more than 200 cities have reported the use of the recommendations prepared by the building code committee, and half the same number have reported use of the recommendations on plumbing prepared by the subcommittee on plumbing. That further use will be found for them is indicated by a recent survey in which it was reported that 281 cities are engaged in revising their building codes and 191 in revising their plumbing codes.

#### Building practice and home builders' problems.

More than 300 construction and equipment details of small houses will be the basis of a report to be published during the coming year by the division. These have been obtained from a survey of representative small houses in 31 of the principal cities of the United States. When the report based on this survey is issued, there will be available accurate knowledge of the design, construction, layout, and equipment of small houses being erected in various sections of the country. There will be information, for example, on such items as the installation of improvements and conveniences, the location of garages and porches, typical room sizes, ceiling heights, materials used, and the amount of equipment usually furnished. Such a report will serve as a basis for improving standards of small-house construction, for effecting economies, and for educating home buyers.

A new pamphlet, Care and Repair of the Home, is being prepared. This is designed as a practical manual for all householders. The national maintenance and repair bill, amounting probably to several hundred million dollars a year, indicates the importance of repairs, and the possibilities for savings amounting to even a small proportion of this sum. A pamphlet whose purpose is to aid families in solving the problems encountered in planning or choosing the plans for a home is also being prepared.

#### City planning and zoning.

City planning and zoning have commanded a much enlarged interest in recent years because of the greatly augmented building program, the larger proportion of apartment houses, and the growing problem of street traffic congestion.

In 1921 zoning ordinances had been enacted in a few cities, regulating the height of buildings, the area of the lot which they might cover and the use to which they might be put, with varying regulations for different districts of the city. These had met the desire of cities to preserve residential districts free from wanton intrusion by large public garages or sporadic

stores and apartment houses, and to keep apartment houses and business districts free from intrusion by noisy industries.

#### A zoning primer prepared by committee.

The Advisory Committee on City Planning and Zoning, appointed by Secretary Hoover to work with the division of building and housing, accordingly set forth the possibilities of city zoning in popular style in *A Zoning Primer*, which has been characterized as the most influential single publication in the field. There was at the time grave danger that so novel and far-reaching a means of public control over private property might develop along unsound lines; and the committee drafted a standard State zoning enabling act, which, when adopted by a State legislature, permits municipalities to enact zoning ordinances under proper safeguards. The act has been followed in legislation adopted in at least 35 States.

In 1921 when the Advisory Committee on City Planning and Zoning commenced its work, there were about 60 zoned municipalities. At present there are more than 780 ranging in size from villages of a few hundred inhabitants to Chicago and New York, and comprising a total of more than 37,000,000 inhabitants, or more than three-fifths the urban population of the country, according to the 1920 census.

#### Division makes surveys.

The division has made a number of careful surveys of zoning progress and city planning activity in the United States, and handles a large number of inquiries from civic bodies and municipal officials interested in these subjects. Recent publications include *A City Planning Primer* and *A Standard City Planning Enabling Act* which have served already as the basic for city planning laws adopted in a number of States.

Such acts permit municipalities to create city planning commissions, control the layout of new subdivisions, and prevent building in the bed of mapped streets, and authorize the creation of regional planning commissions for cities, or groups of cities, and the territory surrounding them.

#### Economies and statistics.

Sustained and healthy construction activity is essential for stable employment, rising living standards, and the general prosperity of the country. The American people have been spending from six to seven billion dollars a year, or nearly one-twelfth of their income, for construction during the past four or five years. It is fundamental that this construction be carried out economically, and at a fairly even rate, not accentuating the ups and downs of general business and employment, but, if possible, acting as a balance wheel by speeding up when other business is slack.

Construction materials, including lumber, cement, steel, and many other vegetable and mineral products, are produced in practically all sections of the country and furnish about one-eighth of the total railway freight carried. A decrease in building activity, therefore, is quickly and widely felt, while an insistent over-demand at any one time may lead to an inflationary boom with inevitable reaction.

#### Studying public works.

In line with these problems, a study of public works and the stabilization of employment is being carried

on at the present time. The purpose of this work is to determine to what extent, as a practical matter, public works construction can be timed so as to take up the slack in employment during periods of depression and contribute to general stability in business.

In further promoting stability, the division collects and makes available basic statistics relating to building activity and production, consumption, and stocks on hand of building materials, for the guidance of business groups. It publishes periodic reviews of construction activity, collects, in conjunction with the Census Bureau, retail prices of building materials as paid by contractors in about 50 cities each month, and makes special reports from time to time.

The division also cooperates with the Survey of Current Business in the Census Bureau, in presenting monthly statistics relating to construction and building materials. It answers many inquiries from private companies interested in construction, cost accountants, and trade associations, and puts them in touch with the statistics from nongovernmental as well as governmental sources.

#### **Standard State mechanics' lien act.**

It has been believed by many persons interested in the construction industries that considerable delay, annoyance, and expense could be avoided if there were greater uniformity in the mechanics' lien laws of the various States. At the request of a number of organizations of builders, material producers and dealers, and real estate owners, the Secretary of Commerce appointed a committee of representatives of these groups and of subcontractors, building trades labor, architects, engineers, and financing and surety groups. They have undertaken to draft a mechanics' lien act which can be used as a basis for uniform State legislation.

The first tentative draft of an act was distributed to qualified individuals and organizations for criticism and a second tentative draft, prepared in the light of suggestions received, was circulated in like manner. Amendments to this latter draft are now

being considered with a view to perfecting the act. Cooperation is maintained with a committee of the National Conference of Commissioners on Uniform State Laws, appointed to consider the same subject.

#### **Home ownership.**

One of the principal aims of the division is to encourage home ownership on a sound economic basis. In acquiring a home, a family usually learns habits of saving for a definite end and develops more of a sense of civic responsibility. Home ownership also stimulates a continued demand for new dwellings and promotes interest in sound construction.

Residential building has amounted to more than 40 per cent of all construction in the United States during the past five years, and the division's work on building codes and city planning and zoning tends to make a higher percentage of home ownership feasible.

#### **Home-financing methods.**

A booklet entitled "How to Own Your Home," prepared in the division, has had a sale of more than 350,000 copies and has been extensively quoted in the press. The pamphlet, Present Home Financing Methods, which is designed to aid home buyers and which suggests improvements that may be made in existing financing facilities, was recently issued to supplement it. Preliminary library and field work has been done toward a more thorough field study which will be required to get at the root of the home-financing problem.

The division does not prepare house plans, but cooperates with the Architects' Small House Service Bureau, an organization controlled by the American Institute of Architects. The division has also given substantial assistance to Better Homes in America, an educational organization with headquarters in Washington, which aims, among other things, to make available to several thousand voluntary "better homes" committees throughout the country information from Government sources.

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### **METHODS FOR STORAGE OF PHOTOGRAPHIC AND X-RAY FILMS OUTLINED**

#### **Use of Noninflammable Substitute Advised Wherever Practical**

As the result of a recent study of the hazards incident to the storage of photographic films, the bureau has issued certain recommendations on this subject. The storage of nitrocellulose photographic, motion picture and X-ray film presents special hazards to both life and property. These films are very flammable and can be decomposed and ignited at relatively low temperatures. The gases given off are very poisonous and also more or less explosive when mixed with air. For this reason care should be taken in storage which should be made in proper structures.

#### **Nitrocellulose base for nitrate films.**

Nitrocellulose forms the base for nitrate films. This material is similar to celluloid and, on heating to temperatures somewhat above the boiling point of water, decomposition will begin, which proceeds very

rapidly and develops heat, so that flaming often results. Large quantities of toxic gases are produced which include oxides of nitrogen and carbon monoxide. Due to the moderate temperature at which decomposition can start, sources of heat, such as electric-light bulbs, high-pressure steam pipes, and glowing cigarettes, are capable of igniting the film.

For safety storage, film in any quantity should be kept either in cabinets or vaults. These should be fire resistive, protected by automatic sprinklers, and vented to the outside air. Vaults should preferably be located on the roof or in a separate building. Special requirements are to be met in lighting and heating. Smoking and the carrying of open flames into the film storage are to be prohibited. The handling of the film should be done by trained personnel who understand the hazards involved.

The use of cellulose acetate or "safety" film is recommended as this film is no more hazardous, in storage, than ordinary paper. The requirements for storage of safety film, therefore, do not have to be nearly as rigid as those for the more inflammable nitrocellulose film.

## RESEARCH FOR THE LEATHER INDUSTRY

**Shortage of Leather in World War Led Bureau to Conduct Research for Substitute—Industry and Army Cooperated—A Laboratory Research Regarding Acid in Leather Now in Progress**

By HENRY D. HUBBARD, *Assistant to the Director, National Bureau of Standards*

The possibility of a shortage of leather during the World War led to a study by the bureau of suitable substitutes for leather. Standard methods were worked out for testing composition soles, as to thickness, density, tensile strength, elongation, and resistance to abrasion on the original soles. The soles were then aged in an electric oven for 14 days and the strength, elongation, and abrasion resistance again determined. The abrasion tester was developed at the bureau.

The wear of composition soles differed but little, but their serviceability was reduced by the wear at

Association of Tanners, the military authorities at Camp Meade (now known as Fort George G. Meade), and the American Leather Research Laboratory heartily cooperated in this successful research.

To decide whether added glucose and salts favorably affected the wearing quality of leather, four typical tannages were tested. The resulting leathers were placed on shoes worn by soldiers, and the wear per day was measured. Each pair of shoes was soled with the two types, one sole of filled and one of unfilled leather. Five hundred pairs of shoes were thus subjected to actual wear with weekly inspection by



*Typical failure of shoes, by cracking across ball of foot*

the toes, pulling out of stitches, and cracking. Half soles sewed or nailed to the shoes showed wear equal to that of leather, but the tendency to work loose again reduced their serviceability.

### **Leather in storage has slight deterioration.**

It was found that ordinary storage of leather did not materially affect its quality. Leather stored under usual conditions of humidity, temperature, ventilation, and light deteriorated in tensile strength only 15 per cent after 10 years. Both extreme dampness and sunlight should be avoided, but shoes, luggage, and other leather products will, it is now known, give very satisfactory service even if one to three years elapse between factory production and purchase by the consumer.

### **Army cooperation given in tests.**

Complete data were gained on the relative waterproofness of the different tannages and the leather from the different portions of the belt. The National

experts from the bureau. The results were given to the industry. Parallel with service tests, a special machine was designed to give a mechanical duplicate in the laboratory.

### **Materials for waterproofing shoes studied.**

The characteristics of stuffing materials for waterproofing shoes were ascertained. They should not be detrimental to the leather, should be free from such harmful impurities as acid, should be chemically inactive and not easily decomposed, should remain in the leather, hence, should be nonvolatile, highly viscous, and not be easily emulsified.

The material should be insoluble in water, should not stiffen the leather unduly, but preferably make it more flexible, and finally, such materials should not dry out hard or separate into their constituents on standing. Many materials were examined, a number were approved, and several new materials were suggested for use.

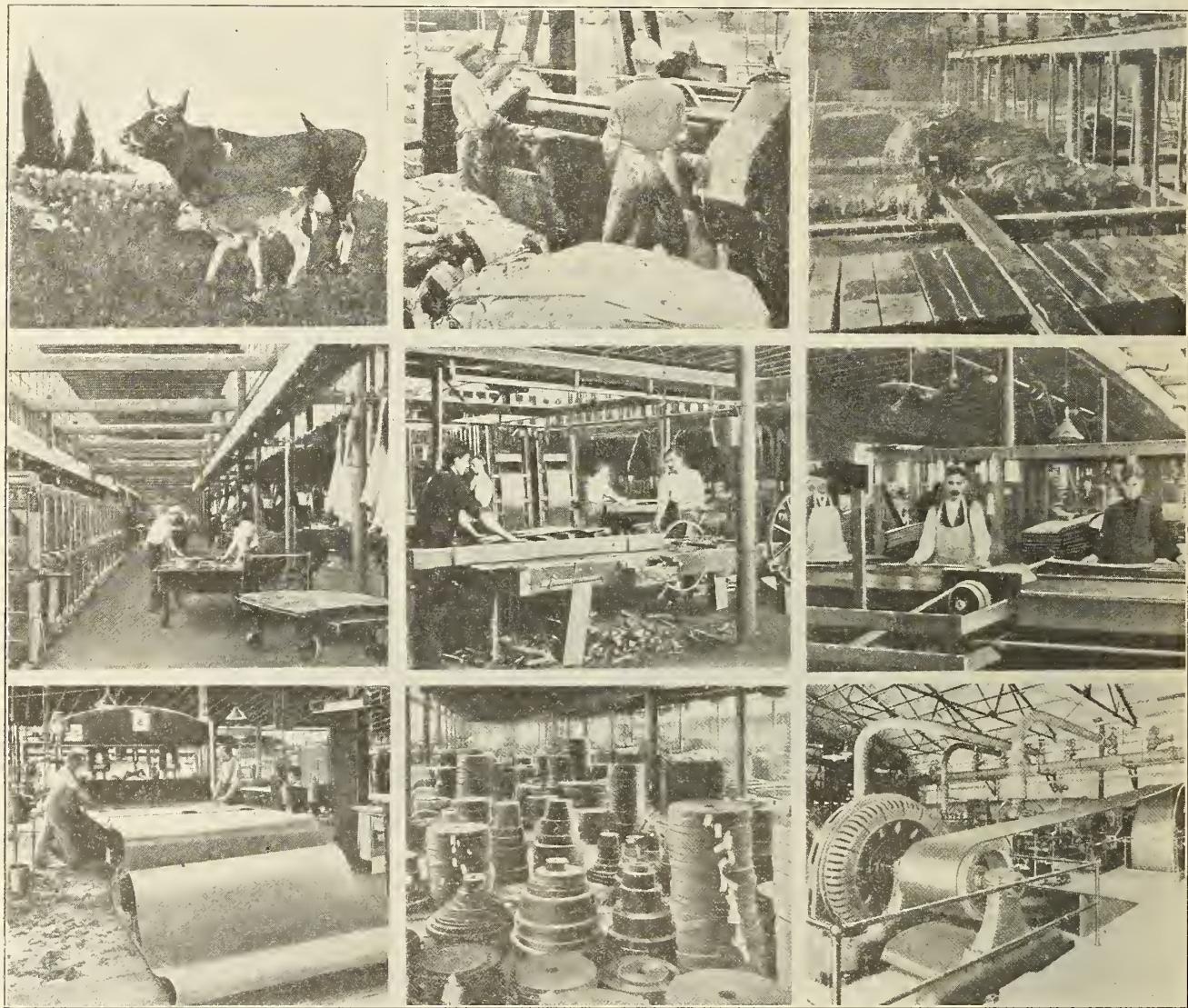
### Sulphite cellulose used as filler.

In making wood pulp, waste water full of organic material runs off from the pulp mills. A research at the bureau disclosed that such waste material (known as sulphite cellulose) may be used as a filler for leathers, producing a leather as durable as that filled with more expensive chemicals.

The almost complete destruction of chestnut trees by the blight has cut off the chestnut-wood supply

eral specifications forbidding the use of sulphite cellulose extracts was eliminated.

The results will be to lower tanning costs, free the tanning industry from dependence upon foreign materials, tend to offset the loss of domestic chestnut-wood supply through blight by the utilization of a product now largely wasted, and finally to reduce stream pollution and the loss in fish yield incident thereto.



*Pictures showing steps in manufacture of leather from raw product (cow) to finished product (leather belting)*

used in tanning, one of the greatest resources of tannic acid. Now comes a cheap waste recommended by the bureau to fill the gap with efficiency and economy. Sulphite cellulose was shown to have positive tanning properties. Actual tanning experiments showed that sulphite cellulose may be blended with the usual vegetable tanning materials. The resulting leather compares favorably with that made with the usual vegetable materials both chemically and physically.

### Federal specifications clause eliminated.

The leather containing sulphite cellulose was conclusively shown to be in no way impaired as to quality and utility. As a result, the clause in certain Fed-

### Mineral type and cod oil have same effect.

One research showed the point at which the stuffing of russet harness leathers with oils and greases affects most favorably the tensile strength of the leather. Mineral-type oil has the same effect as cod oil, and short-time tannage makes for greater tensile strength, but longer-time tannage produces greater resistance to shear when used with a buckle.

A laboratory research on the effect of acid in leather is in progress. Standard leathers were filled with varying percentages of acid, and 672 specimens so treated were tested for initial tensile strength and stretch, then stored for aging for periods of 2, 4, 6, 9, and 12 months. The results are not yet available.

## PARAMOUNT PICTURES RECLAIMS \$6,000 WORTH OF SILVER A MONTH FROM FILM DEVELOPER

**Each Week's Solution, Used in Developing Miles of Film, is "Mined" for Silver Left in It; 5,000,000 to 6,000,000 Feet of Film Pass Through Tanks Every Week; Valuable Silver Residue Was Formerly Thrown Out**

"Six thousand dollars a month in salvage from material that had formerly gone to waste! That's the remarkable record," according to Frank H. Williams, in the magazine *Salvage*, "now being made by the photographic laboratory of Paramount Pictures in Hollywood, Calif. Silver is one of the ingredients used in the developing and printing of motion pictures. Such large quantities of motion pictures now go through this particular laboratory that the silver involved in the process amounts to this huge figure."

Photographic film is surfaced with a solution of silver. When this silver-coated stock passes through a motion-picture camera, it is treated to a rapidly varying and shifting flood of light rays. This light "cuts" into the microscopically thin veneer of precious metal on the film. Thus, rays from a white dress completely oxidize the sensitive emulsion on the film while black leaves it entirely unaffected. All varying degrees of black and white have an effect upon the silver in direct ratio to their light content value.

It is evident, then, that some of the silver on each bit of film is untouched. Now when the film is developed the hyposulphite and other chemicals search for the oxidized silver surfaces. Those places on the film where the silver is "burned" are washed off and the clear surface is left. This freed silver then remains in the solution used in developing the film or it may even settle at the bottom of the tank.

Each week the developer used in developing the firm is "mined" for the silver it contains. This mining consists in treating the developer with a chemical which precipitates the silver. It is a very simple, quite common chemical process.

In this way the developer used in developing from 5,000,000 to 6,000,000 feet of film stock is "mined" each week at the Paramount laboratory, and as the result enough silver is recovered to bring in a return to the company of \$6,000 every month.

At the present time Paramount is selling this silver to the United States mint at San Francisco, where it brings a price of 0.7034 cent an ounce. Before adopting this policy some months ago, the silver was sold to many different buyers. Many of the leading Los Angeles silversmiths were among the purchasers, but it was found easier and quicker and more satisfactory all the way around to dispose of the metal to the United States Government.

It is interesting to know that a few months ago a new janitor was employed at the Paramount laboratory. During the night when, for once, the laboratory wasn't working, he was told to clean up. A part of

the cleaning up that he apportioned out for himself consisted in dumping out large quantities of used developer which had been stored waiting to be "mined." In this way several hundred dollars worth of silver went splashing through the sewer lines to the sea.

Paramount is the leading studio engaged in the salvaging of silver in this way, as it has the largest laboratory, and as it does the laboratory work for a considerable number of other Hollywood studios. The present method of salvaging the silver has been worked out by Frank Garbutt, who is in charge of the Paramount laboratory.

In addition to salvaging silver from developer in this way, Paramount also calls in old film from time to time, burns it in a crucible, and thus recovers silver from it. The amount of silver salvaged in this way may run from nothing to \$1,000 in a month, depending upon how much old film is called in.

For many years photographers have employed a somewhat similar method in salvaging silver from photographic paper refuse. This waste is incinerated and the ash treated with dilute nitric acid. The liquid is then filtered and the silver precipitated by copper. The ash may also be digested with strong hydrochloric acid free from nitric acid, and then the washed and dried residue fused with its own weight of soda and about ten-fifteenths per cent saltpeter. The metal obtained is then dissolved in nitric acid, when a residue containing gold may remain. This residue is dissolved in aqua regia, the solution diluted and precipitated by green vitriol; the gold obtained is washed, dried, and melted with saltpeter and borax.

In the method just given, in which silver is separated by copper, it will be found that in some gold and silver separating works the silver obtained in sulphuric acid solution is separated by iron instead of copper. The objection to this process is the loss through the evolution of hydrogen, the simultaneous precipitation of copper, and the contamination of the silver by phosphorus, silica, etc., from the iron. The objections, however, are removed by allowing the silver sulphate solution, with the addition of water, to crystallize, and then reducing the crystals by scrap iron. The crystals are stirred with water and iron gradually added so that every trace of silver is precipitated while copper remains in the solution. The impurities contained in the iron go into the slags produced when the silver is fused, so that the silver is obtained in a purer state than when copper is employed. The principal advantages of this method are said to be economy in acid, since the mother liquors from the crystals again go into the dissolving vessel; avoidance of the purchase of copper, which is not well utilized as blue vitriol; economy in steam, since the solution becomes very hot spontaneously.

## REMARKABLE MATERIALS USED IN RESEARCH AT THE BUREAU OF STANDARDS

**Columbium and Tantalum Are Rare Metals; Bees Make Peculiar Sugar; Bureau Makes Tests on Radium for Radioactivity Straight; Radium Valued at \$32,000,000 a pound**

By HENRY D. HUBBARD, *Assistant to the Director, National Bureau of Standards*

Among the rare metals of great current interest to come under investigation at the bureau in connection with the bureau research to produce new materials or add new utilities to old materials are columbium and tantalum (atoms Nos. 41 and 73), metals which are related. These have been known for some time but only recently have been prepared in isolated pure form as metals and specimens furnished the bureau for spectroscopic study.

This made possible the study of the unknown wave lengths of the characteristic radiations of these two elements—a work which is now in progress. The work is complicated by unusual difficulties and includes the measurement of thousands of wave lengths.

To retard the flow of heat through a wall or other separator is most important in scientific work. For this purpose, "siolcel" (the pure silica remains of ancient microscopic life forms, diatoms) is most useful. When the bureau cast from a single melt the large optical glass disk 70 inches in diameter, it was promptly enveloped in a thick layer of siolcel within which it was allowed to cool for eight and one-half months at a predetermined rate, so that the disk might form without internal strain.

In the same class of materials for retaining heat or keeping it out where it is not wanted, the industries are developing light materials with fine air spaces by special treatment of such materials as rubber, cement, gypsum, and the like, the lightness of which may be controlled by the technique of manufacture. In response to numerous requests the efficiency of these in retarding the flow of heat has been measured in the heat laboratories.

### Paper laboratory makes many tests.

In the bureau's paper laboratory experiments have been made on a great variety of fibers in quest of suitable paper-making materials—banana fiber, cornstalks, cotton linters, and many others. In one research a small specimen of paper was made experimentally of human muscle fiber for surgical use as

a possible material in operation. Paper is a felted mat of fibers, and paper makers can make paper of practically any material of a fibrous nature.

### Bees make sugar.

Among the many rare sugars made up and studied is a peculiar sugar made by bees. In time of drought when bees feed on the gum of trees there is formed "melezitose," a quickly crystallizing sugar which has been separated in the sugar laboratory. Many rare sugars have been produced here, some of them for the first time anywhere—sugars predicted by theory and sought and found in experimental research. These have been studied as to their optical properties. Some of these rare sugars are xylose from sawdust, mannose from manna, fucose from seaweed, mycose from fungi, arabinose from gum arabic. Some of these have sold as high as at the rate of \$200 a pound.

The bureau tests radium for radioactivity straight or radium content equivalent. Radioactive materials are of extraordinary interest. It is valued at \$32,000,000 a pound.

### Radium atom life is 2,440 years.

Radium is the machine-gun element, exploding uncontrollably. Its projectiles are electrons flying with almost the speed of light, and helium atoms moving thousands of miles a second. It emits gamma rays 1,000,000 times the frequency (waves per second) of ordinary light waves. One gram of radium ejects 34,000,000,000 helium atoms a second. At this rate the average lifetime of radium atoms is 2,440 years, in which time half of it would be converted into another element—radon.

Radium is of great importance in atomic research. An improved form of device has been devised at the bureau for counting the individual atoms ejected in radioactive explosions. The certification of radium for its radioactive equivalent is important in order that dosage may be more accurately controlled and also as a basis for the purchase and sale of radium everywhere.

## REVISED FEDERAL SPECIFICATIONS

Seventeen Revised Specifications Promulgated; Several Others Proposed

The Federal Specifications Board has announced the promulgation of the following revised Federal specifications: Oatmeal and rolled oats; barley, pearl; biscuit; corn meal (white or yellow); cornstarch; crackers, soda; flour, wheat; flour, buckwheat; flour, graham (whole-wheat meal); tapioca; hominy grits and hominy grits, coarse; hominy, lye, canned; rice; spaghetti, macaroni, and vermicelli; tea; cocoa, and chocolate. Copies of these specifications may be ob-

tained upon request, by addressing the Federal Specifications Board, National Bureau of Standards, Washington, D. C.

The board also announced that several specifications are now being circulated for comment. These proposed specifications cover such items as couplings, garden hose, water hose, and wash-deck hose; couplings, water suction hose; basic carbonate white lead (dry, paste in oil, and semipaste in oil); green paint, semipaste and ready-mixed; planes; solvent, dry cleaning; couplings, pneumatic hose and spray hose; couplings, steam hose; chickens, dressed, broilers, fryers, and roasters; fowl fricassee, dressed.

## RECORD AND PRINTING PAPERS

**Conference Held at Bureau as First Step; Industry Considering Establishing Commercial Standard**

A most important step toward the adoption of standards for producer, consumer, and distributor requirements for record and printing papers was taken on October 2, at the bureau. In a preliminary national conference arranged by the bureau, upon the suggestion of the National Association of Purchasing Agents and the American Pulp and Paper Association, the requirements of distributors and users of fine papers were thoroughly discussed, and arrangements made for the appointment of a committee to prepare a preliminary draft of specifications for such papers.

Upon the subsequent consideration and approval of these specifications at a later meeting, it is planned to establish the requirements as a commercial standard for record and printing papers which will be published by the bureau.

The conference may be said to have been an outgrowth of the bureau's work on the simplification of paper sizes, which originated through the appointment of a committee by the Secretary of Commerce in August, 1921, to investigate the number of sheet sizes of paper with a view to possible reduction. As a result Simplified Practice Recommendation No. 22, Paper, was issued in 1924, and became effective on July 1, of that year.

### **Proposed standards to cover 13 kinds of paper.**

The present conference confined itself to a consideration of requirements in terms of service and utility without reference to production processes or

### **SPECIFICATION FOR TAPERED SHAFT ENDS AND HUBS FOR AIRCRAFT ENGINES**

**S. A. E. Specification Provides Series of Splined Shafts and Two Sizes of Tapered Type; May Add Additional Shaft to Be Known as S. A. E. No. 50**

The present S. A. E. specification on shaft ends and hubs for aircraft engines provides a series of splined shafts and two sizes of the tapered type, reports the S. A. E. Journal, official publication of the Society of Automotive Engineers. At the standards session of the aeronautic meeting recently held in Cleveland, Ohio, F. W. Caldwell, of the Standard Steel Propeller Co., called attention to the fact that there are now in existence approximately 30 different tapered shaft ends smaller than the S. A. E. No. 1.

"These shaft ends are substantially the same except for the slight variations in the taper and the size of the shaft, and it was suggested at this meeting that the aircraft engine division of the standards committee give consideration to the adoption of a standard tapered shaft end, to be known as S. A. E. No. 0, to remedy this situation. It was also stated at this meeting that the present S. A. E. No. 1 was not identical with the shaft used on the OX-5 engine. As the understanding at the time of the adoption of this shaft end was, that they were identical, this matter is

fiber content. The standards are to cover 13 different kinds of paper, including blotter, bond, book, bristols, coated board, cover paper, envelopes, ledgers, manifold, mimeograph, offset, post-card stock, and safety-body stock.

The distributor and user requirements were set forth by representatives of bankers, public utilities, insurance companies, investment houses, industrial groups, printers, paper dealers, the Educational Buyers' Association, and the National Association of Purchasing Agents.

The assistance which the Department of Commerce is prepared to render was briefly touched upon by the Director of the Bureau, Dr. George K. Burgess, in his opening remarks, while the Assistant Director for Commercial Standards, Ray M. Hudson, described briefly the steps which led to the adoption of the simplified practice recommendation covering paper sizes, and explained what could be done to increase still further the value of the bureau's work in the manufacture, distribution, and sale of paper. I. J. Fairchild, chief, division of trade standards, presided over the conference.

**Tentative date for general conference is April 8, 1930.**

The conference set Tuesday, April 8, 1930, as the tentative date for the general conference, at which time the proposed standards of the committee will be considered by all interests for adoption as a commercial standard for every-day trade in the industry.

also being investigated by the division," reports the S. A. E. Journal.

The series of splined shaft ends most probably will be augmented by the addition of a shaft, to be known as S. A. E. No. 50, similar in size to that now in use on the Hornet geared engines, as it was brought out in the meeting that a definite need exists for shaft ends of this larger size.

### **WAREHOUSING OF BOLTS AND NUTS**

**Excessive Variety of Bolts and Nuts Make Warehousing a Difficult Problem**

Because of the multiplicity of sizes and types which must be carried in stock, the warehousing of bolts and nuts is one of the most difficult problems for the manufacturer of these products, according to a recent article in the Iron Age. At the Lebanon, Pa., plant of the Bethlehem Steel Co., for example, about 12,000 tons of these products and 3,000 different items are nearly always carried in stock.

These bolts and nuts are stored in bins of varying sizes, some holding as much as 80,000 pounds each. Kegs of bolts and nuts are packed through openings in the bottoms of these bins. Skilled workers assemble as many as 1,100 kegs a day, based on standard size No. 12½ keg, which means the handling of more than 15,000 pieces a day.

## ADVOCATES STANDARDIZATION OF SMALL-DIMENSION WOOD STOCK

**Lack of Supply of Stock Has Heretofore Handicapped Program Committee Issues Pamphlet on Subject;**

Without exception, standardization has proved itself to be practical in all industries to which it has been applied. The lumber industry was among the first to recognize the advantages of standardizing the sizes and grades of its products and has benefited as the result of its decision to fall in line with other progressive industries. It is difficult to understand, says the National Committee on Wood Utilization, the reason for an almost complete lack of standardization of small-dimension stock.

The production of small-dimension stock, that is, hardwood or softwood, cut to size at or near the source of supply and 100 per cent usable to those industries

and chair manufacturers, and wood-turning plants are at present the largest consumers of small-dimension stock. Large quantities of this material are used, however, in the manufacture of such products as agricultural implements, battery boxes, caskets and coffins, electrical machinery and apparatus, laundry appliances, musical instruments, railway cars, sporting goods and toys, window and map rollers, and many other such articles.

### **Need for standardization found.**

One of the principal facts developed by the committee is a need for the standardization of sizes and grades of small-dimension stock. The entire quantity of stock manufactured under recognized grading rules at the present time is very small compared with the total dimension production. Probably 95 to 98 per cent of small-dimension stock is cut and graded under order specifications rather than under generally accepted grading rules. Increased production of dimension stock manufactured under accepted grading rules or specifications established by each branch of the industry, including automotive, furniture, wood-turning, and similar branches, is an apparent need.

As the situation now stands, it is impractical for manufacturers of small dimensions to cut for stock unless they know that this material will be purchased by reliable consumers. With the establishment of standard sizes and grades the manufacturer would be assured of a market for such material, and could utilize odd sizes of lumber, left from cutting larger orders, for the manufacture of standard chair legs, stretchers, or other forms of small-dimension stock, whether he had specific orders for them or not, since as standard material they would always be salable. Under these conditions a producer could utilize larger percentages of stock than the man who cuts for a limited number of orders. Furthermore, with standardization a fact, the producer can safely manufacture during the slack months and thus eliminate the overhead and carrying charges which accumulate during periods of production activity.

### **At present consumer must order weeks in advance.**

Under present conditions the consumer of small-dimension stock must place his order several weeks in advance of expected delivery. If sizes and grades were standard, a large percentage of all orders could be taken from stock, thus insuring the consumer prompt service. Finally, small-dimension standardization would eliminate the necessity for keeping orders separate, would economize mill space, and would simplify the taking of inventories.

Although the standardization of sizes and grades of small-dimension stock has not become an accomplished fact, a foundation for standardization has been laid. The United States Forest Products Laboratory has investigated the hardwood consuming field and has issued a report entitled, "Sizes and Quantities of Rough Cuttings Required by Hardwood Consuming Industries." This report contains in-



*Standardized American small dimension stock in shed of French agricultural implement factory*

which fabricate and assemble wood products, is one of the most recent developments in the lumber industry. Small-dimension stock is also called dimension, small-dimension, ready-cut stock, and fabricated stock.

### **Committee compiles report.**

The principal difficulty attendant upon the popularizing of the use of small-dimension stock has been that a satisfactory supply of it has not heretofore been available. With a view to encouraging the establishment of reliable sources of supply of this material, and of promulgating information as to the most authentic practices employed in the industry, the National Committee on Wood Utilization, of the Department of Commerce, has compiled a report, *Small-Dimension Stock, Its Seasoning, Handling, and Manufacture*. This report will be soon be available in printed form.

Investigations of the committee show that small-dimension stock has been found especially convenient and effective for use in a number of wood-using industries. The automobile and truck body, furniture

formation as to the sizes most used in nine important consuming industries; and the National Hardwood Lumber Association has adopted rules regulating sizes and grades for furniture stock and turning squares.

Even though these accomplishments are only an initial step in the standardization program, they form a basis on which to build for standardization in all branches of the dimension-consuming field, so that

at some not far distant time we may hope to arrive at a condition of complete standardization of ready-cut stock with benefits resulting both to the consumer and producer.

It is because the National Committee on Wood Utilization realizes the importance of the standardization of sizes and grades of small dimension, that it has devoted a chapter of its report on small dimension to this subject.

## BRITISH, CANADIAN, AND AUSTRALIAN NATIONAL STANDARDS ASSOCIATIONS

**British Association Is the Oldest of Bodies; Canadian Body Formed in 1919; Australian Association in 1922; Duties and Accomplishments of Each Discussed in Article**

The British Engineering Standards Association is the oldest of the standardizing bodies which are functioning now in 20 countries. It was organized in 1901 by the Institution of Civil Engineers, Institution of Mechanical Engineers, Institution of Naval Architects, Iron and Steel Institute, and Institution of Electrical Engineers. It is now incorporated under English law.

A main committee has executive authority and controls administration. The expenses are paid largely from contributions made by industries, although the British and Dominion Governments provide some funds. Sectional committees are formed to prepare standards.

The association itself does not initiate standards projects. When a proposal for standardization in a certain field or the need for a standard specification for a commodity is presented to the body by technical or trade organizations, a representative meeting is called to consider the proposal. If the meeting approves proceeding with the project, a sectional committee is organized. The B. E. S. A. reserves the power to appoint the chairmen only of all sectional committees.

### Has promulgated between 300 and 400 standards.

Since its organization, the B. E. S. A. has promulgated between 300 and 400 standards and standard specifications. These fall within the scope of 11 major sections; that is, aircraft, automobile, chemical engineering, civil engineering, colliery requisites, electrical, mechanical, metallurgical, petroleum products, ships material and fittings, and transport.

Some of these standards have been withdrawn and a number have been revised or amended. A few selected specifications have been translated into foreign languages and published in Spanish, French, Italian, and Portuguese editions.

### Canadian Engineering Standards Association.

The Canadian Engineering Standards Association was formed in 1919 under the auspices of the Dominion Government. Like the B. E. S. A., it has a main or executive committee which directs its activities. At first, funds for the expenses of the organization were appropriated by the Dominion Govern-

ment; but the budget is now provided by industries and the National Research Council of Canada.

Sectional committees are formed to prepare standards. These sectional committees have power to appoint advisory technical committees. The main committee and the sectional committees cooperate and consult with the British Engineering Standards Association. This is found to be mutually advantageous and avoids duplication of effort. Because of different conditions or methods of manufacture, some specifications developed by the Canadian body, vary from those for a like commodity promulgated by the British organization.

The Canadian standards, which have been promulgated or are being developed, fall within the scope of seven major divisions, namely, civil engineering and construction, mechanical work, electrical work, automotive work (including aircraft), railway work, ferrous metals, and mining machinery.

### Australian Commonwealth Engineering Standards Association.

The Australian Commonwealth body was organized in 1922 under the auspices of the Commonwealth Government by the Commonwealth Institute of Science and Industry, Institution of Engineers, Australasian Institute of Mining and Metallurgy, and the Australian Chemical Institute.

The executive and administrative powers are placed with a main committee and a number of standing committees. While the headquarters are at Sydney, there are branch offices in five other centers.

### Association receives proposals for standardization.

The association receives proposals for standardization projects, and, if investigation justifies the action, forms a section committee to prepare the standard. The body appoints only the chairman. Members of the committee are selected by the interested groups and the association endeavors to see that all interests are taking part in the work.

The specifications, which have been promulgated or are in course of preparation, are within the scope of the following six divisions: Civil engineering, mechanical engineering, electrical engineering, mining, transportation, and the chemical industries.

## IMPORTANCE OF SCREW-THREAD STANDARDIZATION

**More Than 50,000,000 Bolts, Nuts, and Screws Made Daily; Safety of Life Depends Upon Proper Fittings;  
Commission Has Fullest Cooperation**

"An idea of the magnitude of the screw-thread manufacturing industry and of the importance of threaded products in our everyday lives can be gained from consideration of the fact that more than 50,000,000 bolts, nuts, and screws are manufactured in the United States every working day," reports W. H. Bearce, secretary of the National Screw-Thread Commission, and "that practically everything of a mechanical nature is held together by bolts and screws.

In view of the wide use of screw threads in engineering, industry, and everyday life it is apparent that not only the effectiveness and dependability of many manufactured products, and also the safety of human life, is dependent upon the proper fitting and functioning of such threaded products. For example, the failure of a single connecting-rod bolt in an automobile or airplane engine may mean disaster, property damage, and loss of life. Such failures have in the past been all too frequent and they can be averted only by the setting up and putting in practice of proper screw-thread standards. It was for this purpose that the National Screw-Thread Commission was established.

"In the development of screw-thread standards the commission has had the fullest cooperation of engineering societies, standardizing committees, manufacturers and users of screw thread, threading tools and gages, and the standards adopted by the commission have been accepted by industry to such an extent that they are, in fact, as well as in name, American National Screw-Thread Standards."

### **Attention given to establishment of thread series.**

"The commission has given its attention primarily to the establishment of thread series, dimensions and tolerances, and a classification of screw-thread fits

suitable for all ordinary fastening purposes. The classification of fits is on the basis of a uniform minimum hole for all fits, with unilateral tolerances on each threaded member; that is, all variation in the tapped hole or not is from a minimum or basic size to above that size, and all variation in the bolt or screw is from a maximum size to below that size. The tolerance, or amount of variation permitted in the size of each member, is dependent upon the class of fit specified.

Tables contained in the commission's report give the limiting dimensions for each size of bolt and nut, and for all classes of fit. The report also contains detailed specifications for small-hose threads, fire-hose threads, pipe threads, threads for electrical fixtures and fittings, threads for electric lamp bases and socket, threads of special diameters, pitches and lengths of engagement, Acme threads, threads for cutting and welding torches, wood screws, dimensions of boltheads, nuts, and wrench openings, and much material on threading tools, gages, and methods of gaging."

### **Many problems remain to be solved.**

"While most of the work originally contemplated by the commission has now been completed, there are still many special problems in screw-thread standardization that may well engage the attention of the commission to the end that progress in standardization may keep pace with progress in industry.

"The commission has published three reports, the latest being the 1928 revision (Miscellaneous Publication, Bureau of Standards No. 89). This report may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 50 cents a copy."

## COOPERATION WITH ROAD BUILDERS AND HIGHWAY OFFICIALS

**Activities of State Highway Departments Included in 1930 Standards Yearbook; Analysis of Information Being Made by American Road Builders' Association and Bureau**

Information concerning the purchasing and standardizing agencies of the State governments has been given in the several issues of the Standards Yearbook, with special regard to the specification making and using activities of these agencies, according to the division of specifications of the bureau.

In presenting the information in up-to-date form in the 1930 Standards Yearbook, now being prepared for the press, special attention is being paid to the activities of the State highway departments, which are spending not only the State funds, but also much money contributed by the United States Government in accordance with the Federal-aid road construction plan.

Questionnaires for obtaining the needed data were prepared by the equipment standardization commit-

tee of the American Road Builders' Association and a cooperating committee of the American Association of State Highway Officials, and submitted to the road officials in the 48 States. An analysis of the information received is being made jointly by the American Road Builders' Association and the National Bureau of Standards.

## STAPLE PORCELAIN (ALL-CLAY) PLUMBING FIXTURES

**Commercial Standard Printed Booklet Sales Is 8,000**

The manufacturers of porcelain plumbing fixtures have purchased 8,000 copies of the pamphlet entitled, "Staple Porcelain (All-Clay) Plumbing Fixtures, Commercial Standard, CS4-29," of which 5,600 copies have been distributed gratis to 4,500 architects and 1,100 distributors of plumbing fixtures. The remaining copies have been divided among the producers who will furnish them to salesmen and to customers from time to time as occasion may require.

## NEW MARINE STANDARDS SUMMARIZED

**Executive Board Meeting to Be Held This Month; Marine Standards for Wire Ropes; Uniform Outfits for Merchant-Marine Officers; Reinforced Concrete Piles; and Platform Sling Reviewed**

The American Marine Standards Committee has announced that the last meeting of the present executive board will take place this month in New York. The executive board for the year 1930 will be elected during December and will meet in January. At the meeting this month the results of the membership ballots will be reported on the following subjects: Wire ropes for marine uses; sleeve couplings for propeller shafting; mooring pipes; tubular metal berths for ships; standard practice for hull construction.

The American Marine Standards Committee is of national scope, according to its secretary who has offices in Room 713, Department of Commerce Building. It is self-governed through an executive board elected annually by the member interests. Its purpose is to unify practice and eliminate waste in construction and operation of ships and port facilities. The Government is prominently identified with it through members representing the Navy and War Departments, Coast Guard, and bureaus concerned with shipping and shipbuilding. The committee's work is aided by facilities and services furnished by the Department of Commerce through the National Bureau of Standards and by the United States Shipping Board.

### Projects reviewed.

Numerous constructive suggestions, according to the secretary, have been made regarding the proposed specifications for wire ropes, which, considered collectively, have indicated advisability of revision in order to make the specifications practical and useful in the purchase of wire ropes for ships. It is expected to submit a proposed final draft to the board at the meeting this month.

### MANY ECONOMIES TO INDUSTRY EFFECTED BY ADOPTION OF SIMPLIFIED PRACTICE

**Bureau Finds 10 out of 105 Recommendations Bring Savings of \$300,000,000 Annually**

Industry's evaluation of some of the results obtained by adherence to simplified practice shows that 10 out of 105 active simplified practice recommendations are producing for all interests an annual saving of \$300,000,000 declared Edwin W. Ely, chief, division of simplified practice, in an address made last month before the manufacturers' section of the American Gas Association in Atlantic City.

Each of the remaining 95 programs in the list is making its annual contribution to reducing the Nation's waste cost, according to the records of the division, which show the details of those results and benefits as expressed by manufacturers, distributors, and users of the respective commodity. The experience acquired by the division has verified the conviction that one of the outstanding causes of waste in industry lies in too great a variety of commodities produced for stock.

A preliminary draft of proposed standard specifications for uniform outfits for merchant marine officers has been approved by the special subject committee, and is now before the technical committee on "Ship Operation Details" for ballot vote. This covers style and material of uniforms and insignia for license, staff, and petty officers.

A proposed standard specification for reinforced concrete piles, with structural details of piles from 40 to 60 feet long has been submitted to the technical committee on "Port Facilities" for consideration.

The suggestion has been made that a type of platform sling be standardized in the interest of waste elimination in handling ship cargoes packed in cases. It is pointed out that much damage to shipments results from the use of ordinary rope, chain, or net slings, which is not all preventable by strong and expensive boxing and that such damage would be largely avoided even with ordinary boxing if platform slings were used. It is estimated that the possible savings in damages and cost of packing would amount to a large sum annually. It is contemplated to place the subject on the program of work for the technical committee on "Port Facilities."

### Publications available.

Printed publications containing promulgated marine standards are available to prospective users in the marine industry, according to the secretary, as well as to institutions teaching naval architecture and marine engineering. A list of the publications may be obtained from the secretary. Additional copies of the publications can be purchased at nominal prices from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Present-day competition tempts manufacturers to produce excessive variety in the hope of attracting customers, and that some competition makes prompt imitations by competitors inevitable, thus creating a constantly increasing burden which must be borne in part by industry.

Although the ultimate consumer is often able and willing to confine his requirements to these items which fill the major portion of his normal demand, he must assume a share of the burden of added cost for varying charges, obsolescence, additional storage requirements, interest charges, etc., all of which are caused by slowness of stock turnover resulting from excessive variety of commonplace articles.

Simplified practice is a method of reducing waste by eliminating unnecessary variety in industrial products. Varieties of vitrified paving brick have been reduced from 66 to 5; metal lath, from 125 to 24; files and rasps 1,351 to 475; hotel chinaware from 700 to 160; cut tacks and small cut nails from 421 to 181; bed blankets from 78 to 12; milk bottles from 49 to 4; steel lockers from 65 to 17; paint and varnish brushes from 480 to 138; composition books from 86 to 41, with corresponding reductions in the variety of many other articles.

## RESULTS AND BENEFITS OF SIMPLIFYING THE CLASSIFICATION OF IRON AND STEEL SCRAP

Scrap Formerly Sold Without Uniform Specifications; Such Practice Conducive to Unnecessary Confusion; Simplification Program Has Proven Successful

By H. P. DALZELL, *Division of Simplified Practice*

In the past, iron and steel scrap was disposed of under various specifications which were drawn up to meet the convenience of individual interests with scrap to sell. This custom compelled the dealer to use a number of groupings and gradings according to the classification under which the scrap was sold to him. It is obvious that such an arrangement must have caused unnecessary confusion with attendant misunderstanding and loss.

Simplified Practice Recommendation No. 58, "Classification of Iron and Steel Scrap," divides all the commoner kinds of iron and steel scrap into 75 groups and specifies the general requirement for each class. Moreover, it provides a contract form for the purchase of scrap. The history of this recommendation shows with what care and deliberation it was developed by the industry as a measure to correct the above-described uneconomic conditions.

In 1923, the National Association of Purchasing Agents undertook to gather all available data with a view to drawing up a uniform scrap classification. This information was obtained, by the association's iron and steel committee, from the organization preparing the various grades of scrap, the brokers and dealers handling it, and from the various consumers. From the results of this survey, the committee prepared a set of specifications covering iron and steel scrap for use by blast furnaces, basic open-hearth furnaces, acid open-hearth furnaces, electric furnaces, foundries, Bessemer converters, etc.

### Specifications discussed in 1923.

These specifications for classes of scrap were discussed at a preliminary conference held at the Bureau of Standards in Washington, November 9, 1923, and tentative specifications were adopted by the National Association of Purchasing Agents for a period of one year. After that period had elapsed, a second conference, held at the Bureau of Standards on January 12, 1925, changed the specifications and adopted them in the revised form for a second trial period of one year. After each of these conferences, the tentative and revised specifications were published in various trade journals. During this 3-year period of formation and revision, interested parties sent in suggestions and criticisms based on their observations as to the practical application of the specifications. All suggestions for revision were discussed at the yearly meetings, and slight changes were made in the light

of these suggestions so as to arrive at a classification that would truly meet the normal need of the industry.

### Standard contract form developed.

There was also drawn up a standard contract form for the purchase of scrap. The National Association of Purchasing Agents requested the Department of Commerce to assist in securing the attendance of all interests at a general conference to consider the adoption of these specifications in a final form.

It was the opinion of those members of the scrap industry who attended the general conference that, since producers, dealers, consumers, and Government agencies had collaborated in the formulation of the recommended classification, it represented the mature opinion of experts and should satisfy all usual requirements, if periodically revised to meet changing conditions. It was recognized that there are special requirements and conditions which can not be covered by a standard specification. Nevertheless, it is believed that such an instrument affords a basis for mutual understanding and that this in itself should prove of distinct value to the

This is the seventh article, of a series that have appeared in the COMMERCIAL STANDARDS MONTHLY, on the results and benefits that have resulted from the simplification of files and rasps, woven-wire fencing, asbestos millboard, steel barrels and drums, carbon brushes and brush shunts, and loaded shells.

Copies of any of these summaries can be had in mimeographed form from the division of simplified practice, National Bureau of Standards.

industry. The sense of the meeting was that the cumulative benefits of these specifications will become increasingly evident as they are more widely used.

### Program effective in 1926.

The proposed specifications were discussed in detail by the general conference, and some minor changes made. They were then adopted to go into effect July 1, 1926, for a period of one year, at the end of which time a revision conference was to discuss and, if it were found desirable, modify the classifications. The contract form for purchase of scrap was adopted at the same time. It was then decided that such suggestions and criticisms as the industry wished to make should be submitted to the committee on iron and steel of the National Association of Purchasing Agents.

The standing committee held its first annual revision meeting in Chicago on January 18, 1927, in joint session with the representatives of the American Railway Association and the Waste Material Dealers Association.

The primary purpose of the meeting was to reconcile certain differences existing between the published specifications as shown in the original recommenda-

tion and those under consideration as a result of the activity of a committee of the American Railway Association.

The joint deliberations were directed toward determining (*a*) what specifications in the simplified practice recommendation met with the approval of the American Railway Association, (*b*) those specifications which could be changed in wording so as to meet with the approval of the American Railway Association, and (*c*) those specifications which did not apply and could not be worded so as to meet with the approval of the American Railway Association.

Two days were consumed by the committees in discussing suggested changes and revisions, and technical details of the use and disposition of iron and steel scrap. A unanimity of opinion was secured on a majority of the items considered. It was necessary that the American Railway Association's committee submit its recommendations to the general convention of the American Railway Association, held in Chicago during the week of May 23, 1927, for final approval.

#### Railroads offer indorsement.

The joint recommendations of the two committees, to revise and coordinate railroad scrap specifications with the standard classifications adopted under the procedure carried on by the division of simplified practice, of the Department of Commerce, were approved by the American Railway Association at its annual convention through its division of purchases and stores.

The result of the meeting practically insured uniformity as to scrap classification, since the specifications have the approval of scrap dealers, steel makers, and the committee of the National Association of Purchasing Agents representing the simplified practice recommendation on the classification of iron and steel scrap.

No change was made in the contract form for the purchase of scrap.

#### Membership of standing committees.

January 1, 1928, was selected as the date on which the standard classification would become effective, subject to annual revision by a similar joint meeting. The personnel of the present standing committee, of which A. J. Copeland, of the Industrial Brown-hoist Co., Bay City, Mich., is national chairman, is as follows:

*Pacific coast region.*—C. C. Mueller, of A. M. Castle & Co., 32 West Connecticut Street, Seattle, Wash. (chairman); H. W. Christensen, of the Llewellyn Iron Works, Los Angeles, Calif.; J. S. Gabriel, of the Denver & Rio Grande Western Railroad, Salt Lake City, Utah; R. H. Petillon, of the Western Pipe & Steel Co., San Francisco, Calif.

*Southern region.*—C. T. Doerr, of the Alabama Power Co., Birmingham, Ala. (chairman); and E. B. Corbett, of the Harrisburg Pipe & Pipe Bending Co., Houston, Tex.

*North Central region.*—Walter Wenzel, of the Vilter Manufacturing Co., Milwaukee, Wis.; L. E. Jones, of the Heywood Wakefield Co., Chicago, Ill.; E. H. Cordes, of the Stacey Manufacturing Co., Cincinnati, Ohio; H. C. Wickline, of the Union Steel Casting Co., Pittsburgh, Pa.; C. J. Black, of the Indiana

Limestone Co., Bedford, Ind.; and J. W. Hargate, of the Granite City Steel Works, St. Louis, Mo.

*Eastern region.*—B. C. Sawyer, of the Bethlehem Fabricators (Inc.), Bethlehem, Pa. (chairman); F. M. Roos, of the Consolidated Car Heating Co., Albany, N. Y.; A. P. Hickcox, of the Scovill Manufacturing Co., Waterbury, Conn.; M. G. L. Harris, of the Standard Gas Equipment Corporation, Jersey City, N. J.

*Canadian region.*—T. G. Elliott, of the Babcock-Wilcox & Goldie McCullough, Galt, Ontario, Canada; J. R. Hoyle, of the Canadian Vickers (Ltd.), Montreal, Canada; and W. K. McGuffie, of the General Steel Wares (Ltd), Toronto, Canada.

The results of these conferences were the adoption of a single set of specifications for iron and steel scrap and a contract form, for the purpose of scrap to take the place of the many then in use in the trade. This was expected to secure a more uniform practice within the industry and a more equitable basis of negotiation. These benefits would extend to the buyer and the seller with the lessened necessity for expense in grading, sorting, and rejecting.

#### Excerpts from acceptors' replies.

After the recommendation had been in effect for more than one year, the division of simplified practice circularized the acceptors of this recommendation, requesting their opinion as to the value of this recommendation in actual practice. Replies received from this circularization show clearly that dividends are being paid on the time and effort invested by those who developed this program.

"We have been able to place orders over the phone for low phosphorous steel scrap by giving the number of your classification, and with very few exceptions, the scrap received was the same scrap that we had in mind when we made the purchase," the purchasing agent of a company producing steel castings wrote. "We were obliged, up until the time that we accepted your recommendation, to make special trips to inspect the scrap before we placed an order."

"As a result of using your classification of iron and steel scrap, we have in the past three years been able to effect a very substantial saving in purchases of material for our gray iron foundry," the purchasing agent of a machinery manufacturer said. "Aside from the actual saving in money, we have been able to avoid misunderstandings with dealers by having a clear understanding as to the materials which they were to furnish."

"Under the simplified classification of iron and steel scrap accepted by us," the secretary of a foundry and machine works informed the division, "we have eliminated grounds for controversy to a large extent, and expedited adjustment in those cases where the material did not meet specifications. It undoubtedly made it easier to purchase the grade and quality of scrap needed with the added protection and assurance of the least possible chance of misunderstanding between buyer and seller."

"We are using the classification of iron and steel scrap regularly with considerable saving," another industrial machinery company wrote, "we know, because of the proper segregating of various materials."

The director of purchases of a middle western steel corporation wrote that his company is strongly in

favor of simplified practices, but could give no specific instance of dollars-and-cents savings. "However," he continued, "we are thoroughly convinced that the scrap business is a more businesslike basis to-day than ever before, and we are getting a better grade of material for the same price than we formerly received. There is a better understanding of the scrap classification, and this, we feel, is conducive to economy. It has also helped the consumer in the way of according him protection against unscrupulous traders."

"Referring particularly in our case to classification of iron and steel scrap," another steel foundry and machinery company said, "we find that there is greater care taken by the dealers in scrap to avoid misrepresentation in the grades that they are selling. We feel that the results are very satisfactory, since we have had fewer rejections on account of inferior quality, both in chemical analysis and the physical structure of scrap."

"We can not give you any report in dollars and cents, but we can say that the efforts made in the direction of simplified practice are making themselves manifest," an officer of one of the country's foremost motor companies wrote. "Our interest was at first centered in that phase dealing with grading of scrap from a producer standpoint. We have found that these classifications recommended and adopted, as far as they may cover our particular grades, are recognized by consuming mills. However, the benefits we will derive from the broad use of simplified practice will be far-reaching in its direct and indirect savings."

Of course, the recommended classification does not, as net, enjoy universal acceptance. Some additions to the list have been suggested, and these were referred to the standing committee. Emphasis has also been laid on the need for greater cooperation between producers, dealers, and consumers.

#### **Division's part explained.**

One of the more progressive scrap dealers wrote in detail regarding possible means of arousing interest in the standard classification and increasing its adoption, to which Edwin W. Ely, chief, division of simplified practice, replied, outlining the division's part in the project.

"This program," he said, "as you perhaps are aware, was not proposed nor formulated by the Department of Commerce. The iron and steel scrap industry itself is the author of the schedule, while the sole contribution that has been made by the Department of Commerce, has consisted in reaching out and securing the indicated support of those upon whom the success of a program of this kind depends. Of course, it is impractical for us to contact with every individual company and group in the United States who has anything to do with iron and steel scrap.

#### **MANUFACTURERS OF TRACK TOOLS PROPOSE SIMPLIFICATION PROGRAM**

The simplification project formulated by the manufacturers of track tools has been in the hands of a committee of the American Railway Engineering Association, and this committee has suggested a number of modifications of the original program, accord-

"However, the Department of Commerce can not publish simplified practice recommendations until those individuals and groups which represent at least 80 per cent (by volume) of the named commodity have recorded their approval. It is recognized that no standard is of any value unless it is known and used, nor can a standard remain continually adequate without periodic revision. A standing committee is in existence to handle the periodic revisions of the recommendation on scrap and it is expected that this program will be brought progressively closer and closer to the ideal standard. Each time a simplified practice recommendation is revised, we approach the industry for signed acceptances and, in so far as we are able, we actually measure the degree of support that the program is receiving and we also try to increase that support by securing signed acceptances from an augmented list of individual concerns and organizations."

#### **Program meets with approval.**

The general tenor of correspondence on this subject indicates that the classifications of iron and steel scrap have met with approval and are being used with gratifying results. The project is now firmly established and it only remains for the industry to keep it revised to meet changing requirements, and particularly to extend its adoption. The formation of the Institute of Scrap Iron and Steel and its progressive work in stabilizing the scrap iron and steel industry will no doubt be an important factor in standardization on a satisfactory classification. In this connection, it is interesting to note that among the major problems before the institute's research committee is the establishment of a foundation for a clearer understanding of specifications of scrap and a more equitable system of inspection thereof.

Further evidence of the important position to which the recommendation has attained is seen in the following quotation from the report of the purchases and stores committee No. 1, on manual review, of the American Electric Railway Engineering Association, presented at their recent convention at Atlantic City.

No. 1, heavy melting steel and No. 2, melting steel, were included in the revised scrap classification as two distinct classes (8 and 9) to conform, in general, to corresponding classes, including in Simplified Practice Recommendation No. 58, which latter has been accepted by our own association as well as a great number of producers, dealers, and consumers of ferrous scrap. These two classes are well known and in general use in industry.

Copies of Simplified Practice Recommendation No. R58-28, "Classification of Iron and Steel Scrap" (1st revision) can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., price 10 cents.

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ing to information received by the division of simplified practice.

The committee is strongly in favor of a large reduction in the existing variety of track tools, and believes that this simplification will not only benefit the manufacturers, but will be of even greater benefit to jobbers and users.

## ELIMINATION OF WASTE IN INVENTORIES

### **Method of Organizing Committees for the Simplification and Standardization of Stock Reported by the Purchases and Stores Committee No. 5, American Electric Railway Engineering Association Convention**

The importance of delegating final authority for the elimination of waste in stores materials to the members of a standardization committee was especially stressed in a report of Purchases and Stores Committee No. 5 presented before the American Electric Railway Engineering Association convention, held at Atlantic City, N. J., September 28 to October 4.

It is the opinion of the Purchases and Stores Committee, that the method of procedure submitted below, if regularly and carefully followed, will produce the desired results in the simplification and standardization of stock and the disposition of surplus and obsolete materials.

The outline recommended is as follows:

1. Each company should establish its own simplification and standardization committee.

2. The members of this committee should be appointed by the executive head of the company.

3. The members of this committee should represent the departments interested.

4. The chairman of this committee should be the executive head of the stores department.

5. Each member of this committee should be vested with final authority as to the simplification and standardization of stock and the disposition of surplus and obsolete materials within his department; other member's opinions should be carefully considered.

6. The chairman of the committee should call meetings and invite those members who, in his judgment, are interested in the materials to be studied.

7. The executive head of the company should make it mandatory for each member so invited to attend these meetings.

8. It should be optional with any member of the committee representing a department of the company to ask any assistants that he may deem necessary, to attend the meeting with him.

9. The committee should discuss and review each class of stock periodically at the discretion of the chairman.

10. Minutes in detail should be kept of each meeting and a copy of these should be furnished to all members of the committee and others interested; the minutes should show the action taken by the committee as to the findings in regard to each of the various items in order that the recommendations of the committee may be complied with throughout the departments concerned.

11. It is further recommended that the chairman of this committee keep in close touch with the work of and cooperate with the division of simplified practice of the United States Department of Commerce. Many simplifications already proposed and accepted by industry and indorsed by the Department of Commerce include materials used on electric railway properties. Lists of the simplified sizes, dimensions, etc., of these materials which have been especially arranged for the convenience, use, and files of foremen,

storekeepers, engineers, purchasing staff, etc., can be obtained free of charge upon request from the division of simplified practice. It is believed that the concentration of purchases of materials pertinent to electric railway properties on the simplified lines already established by industry and indorsed by the Department of Commerce whenever possible and wherever practicable, should effect benefits redounding to the advantage of electric railway properties.

#### **Public utilities adopt plan.**

In discussing the subject it was brought out that a number of large utilities had already adopted a similar plan. One large utility reports these benefits, after a campaign of three years of simplification and stock reduction. The committee was appointed by the executive head of the company and consisted of one or two representatives from each department, with final authority as to disposition of materials. Their stores executive acted as chairman and arranged meetings at various locations, these being held at least once a year at each location. Minutes of each meeting were made in detail and the responsibility of simplifying, standardizing, and otherwise making disposition of materials was relegated to certain individuals within the committee who reported their analysis and recommendations within a certain length of time. For example, there were 138 sizes and kinds of bolts carried which were reduced to approximately 70; there were 75 sizes and kinds of iron which were reduced to 49 sizes; 24 kinds of paint to 12; 13 kinds of insulators to 7; standard sizes of meters and transformers were established, and numerous items eliminated as stock items, only to be ordered on demand.

#### **Reduced inventories.**

This has resulted in reducing inventories 36 per cent; inventory discrepancies from 1.9 to 0.4 per cent, and expenses 36 per cent. Items were reduced 15 per cent, and individual stockrooms showed reductions of 66, 51, and 47 per cent, etc. The turnover now averages three times a year whereas it formerly was 1.7 times a year. Employees were enabled to use the time thus gained in studying better methods of store-keeping. The efficiency of their records increased 29 per cent. This utilities' investment in materials as of December 31, 1927, reflects favorably with 33 other large utilities, since it ranks second lowest when compared with gross earnings.

The committee made the following recommendations to the association:

1. That the proposed method of simplification and standardization of stock outlined in this report be approved as a recommended method manual section for inclusion in the Engineering Manual.

2. That the subjects be continued for the purpose of determining the progress and results of the adoption of these recommendations.

## SIMPLIFICATION OF PRINTED FORMS EFFECT SAVINGS

**Industry Has Adopted 14 Programs in Paper Field; Bank Check Simplification 82 Per Cent Effective; Use of Standard Printed Forms Reduces Costs; Federal Government Saves \$43,000 by Eliminating Printing Duplication**

By S. F. TILLMAN

The requirements of management have become increasingly exacting and management can no longer rely upon unsupported personal judgment or "hunches." Information that is comprehensive, accurate, and timely must be available to enable the carrying out of the programs and to measure performance. Intelligently developed management methods develop such information and provide control of all organization activities and operations.

Among the problems to be met is the elimination of avoidable waste. This is being done through the application of the principles of simplification and standardization. It might, therefore, be said that simplification is an essential of good management.

Simplified practice represents a common-sense application of the principle of eliminating "too much" variety, in both production and selling, by establishing a "simplified" list of sizes, dimensions, styles, and types, which represent those varieties in major demand. A list of the simplified practice recommendations developed by industry may be secured upon request, from the division of simplified practice, National Bureau of Standards, Washington, D. C.

The "simplified" list, or program, is established through agreement of all interested elements of the particular industry concerned—manufacturers, distributors, and users—meeting together in general conference under the auspices of the division. After a general conference has given approval to a proposed program, the division sends it to the industry, by letter referendum, for comments and for signed acceptance. The proposal must be accepted by at least 80 per cent of the industry, by volume of annual production, before the Department of Commerce will publish it as part of the "Elimination of Waste" series.

### One hundred and fourteen programs developed to date.

As of November 1, 1929, industry, with the cooperation of the division, had voluntarily developed a total of 114 programs. It has been the experience of the division that, prior to the adoption of simplified practice by an industry, about 80 per cent of the business of that industry is done on 20 per cent of the varieties manufactured. Obviously, the relatively nonessential 80 per cent of the varieties "eat up" the profits secured from the sale of the popular 20 per cent. Through simplified practice, emphasis is placed upon these items which enjoy the major demand. For instance, here is a list of simplified practice recommendations which touch upon the interests of producers, distributors, and users of paper products.

S. P. R. No.	Commodity	Reductions	
		From	To
10	Milk-bottle caps-----	10	1
19	Asbestos mill board sizes and thicknesses-----	21	4
22	Asbestos paper, sizes, widths, and weights of rolls-----	72	16
22	Paper-----		
34	Warehouse forms-----		15
37	Commercial forms-----		3
42	Paper grocers' bags-----	6,280	4,700
44	Boxboard thicknesses-----	244	60
46	Tissue paper (roll tissue)-----	13	3
	Tissue paper (sheet tissue)-----	21	6
50	Bank checks-----		1
70	Salt packages-----	35	19
84	Composition books-----	86	41
98	Photographic paper-----		

### Simplified forms effect savings.

The use of simplified business documents, such as bank checks, invoice forms, and purchase orders, is producing tangible savings for the business world. Prior to the development of Simplified Practice Recommendation No. 37, Commercial Forms, practically every business concern ordered its forms in amounts to serve their individual needs, with accompanying variations as to the printed contents, size of sheet, and grade of paper. Individual departments of a concern would order printed forms without regard to uniformity of size. This practice naturally caused confusion and waste.

To-day, through the joint action of manufacturers, distributors, printers, and users of certain printed forms, simplified forms uniform in size and printed contents, have been developed. These may be ordered for stock and not printed specially every time the supply runs low. A recent audit of Simplified Practice Recommendation No. 50, Bank Checks, revealed the fact that 82.64 per cent of checks now in use are standard. A prominent banker states that adherence to standard or simplified bank checks means an annual saving of \$20,000,000.

If there were no measurable benefits from the application of the principle of simplification, industry would not be interested. The fact that simplified practice recommendations are effective is borne out by various reports of the Bureau of Standards, released from time to time, showing the average degree of adherence accorded the promulgated programs, which is between 85 and 90 per cent.

### Federal Government practices simplification.

The Federal Government has emulated the example of industry in the same direction. A review of the annual reports of the Public Printer, of the Government Printing Office, from 1922 to 1927, shows that that official is actively engaged in the elimination of waste through simplification and standardization.

The Permanent Committee on Printing was organized in 1921, as the first coordinating agency, under the Bureau of the Budget. That committee consists of representatives of the publications divisions of the various departments, with the Public Printer as its chairman, and has effected the standardization of 38 Government forms commonly used throughout the establishment and 81 other forms used by the General Accounting Office.

The committee expects that eventually there will be but one standard printed form for each routine function of the Government service. Only where it is shown conclusively that a standard form does not meet the needs peculiar to a certain establishment, will special forms be developed.

The use of standard forms reduces printing costs, relieves the Government Printing Office of a congestion of electrotype plates, and simplifies filing devices and systems, and obviates the necessity of storing large stocks of printed forms in each department.

A summary of the outstanding accomplishment of the Permanent Committee on Printing follows: (1) Standardized letterheads, as to paper stock and size; use of embossed stationary restricted; estimated saving \$15,000 a year; (2) saved \$43,000 by restricting duplication in the printing of annual reports; (3) standardized wall calendars for all departments at a saving of approximately \$5,000 a year.

#### Dimensions of Government publications standardized.

The dimensions of Government publications have been simplified to 8 standard sizes, whereas more than 50 sizes prevailed only a few years ago. Three-fourths of the 100,000,000 Government books and pamphlets issued annually are printed in either octavo or quarto size. During 1922 and 1923 nine major periodicals, including several of the Department of Commerce, were standardized to the size of the Congressional Record. This uniformity made possible a gratifying pressroom and bindery economy.

By cooperating with the various Government committees under the direction of the Bureau of the Budget, the size of various forms, such as proposals, contracts, leases, etc., has been fixed at one standard size. This one size is estimated to be saving the Government at least \$50,000 annually. The sizes of the millions of envelopes for mailing Government printed matter have been reduced from more than 12 to 4.

In addition to the economies effected by simplification of these forms, other savings have been made through better shop practice, more careful supervision over the use of materials and equipment. In 1924 these savings amounted to \$283,916; in 1925, \$312,333; in 1926, \$230,838; and in 1927, \$388,883.

#### STRENGTH OF BRICK WALLS MEASURED BY BUREAU

**Complete Series of Comprehensive Tests; Data Given Should Aid in the More Economical Use of Brick and Lead to Economy in Construction, Says Report**

The bureau, in cooperation with the Common Brick Manufacturers' Association, has now completed what is probably the most comprehensive series of strength tests of masonry ever carried out. The results of these tests were contained in the October issue of the *JOURNAL OF RESEARCH*, official publication of the National Bureau of Standards, and will answer many questions for which there has been no authoritative answer in the past.

The tests showed that brick walls which had been kept damp for one week after they were built were no stronger at the age of 60 days than similar walls allowed to cure in the laboratory. They showed that higher strengths can be obtained by having the horizontal mortar beds smooth and level, eliminating all trowel marks, and having all joints filled. When the strength of several of the recently developed types of hollow walls were divided by the allowable working load permitted by building codes governing masonry construction an ample factor of safety was obtained. The relation between brick strength and wall strength and between the strength of walls of different size was investigated.

#### Record kept of tests.

Careful records were kept of the material used in the walls and the time required to build them. These data, showing the saving in brick, mortar, and time for all the types of hollow walls as compared with solid walls of brick of the same thickness, and coupled

with the strength tests, give information which will be of assistance to prospective builders in selecting the type of wall for their homes. The data given in this report should aid in the more economical use of brick and lead to economy in construction.

#### FINDS MARKET FOR WASTE MATERIALS

**Sell Year's Metallic Sweepings for \$100,000; Rubber Shavings Go to Make Bowling Balls; Discarded Tires Used in the Manufacture of Footwear**

The reclaimed-materials organization at the Western Electric Co.'s Hawthorne (Chicago) works now handles and sells about \$7,000,000 worth of reclaimed waste annually, according to an article appearing in *Class and Industrial Marketing*, by D. W. Gee, manager reclaimed-materials division, Western Electric Co. This type of marketing has been characterized as "harvesting the hidden profits of a business," and is truly a constructive marketing job.

The metallic sweepings alone are worth \$100,000 annually. Metal shearings in odd-shaped sizes are used in the manufacture of toys. A chemical by-product is hepta-aldehyde. The old wooden lays used on cable spools are sold to Chicago bakers, because the blaze from the wood makes an even heat for baking bread. Rubber shavings go to make bowling balls. Switchboard wire is dipped in paraffin and sold to radio manufacturers. Discarded tires from the motor fleet, if they have any semblance of tread left, are purchased by a dealer who ships them to Portugal, where they are cut into suitable lengths and used in the manufacture of footwear. Very little of Hawthorne's scrap is sold to junk men. Only low-grade material is disposed of in this way.

## RESULTS OF SMALL-HOUSE SURVEY

**National Survey Covers Trends in Small Dwelling Construction in 38 Cities; Large Variety in Type of Architecture Found; English House Popular; Bungalow Prices Lower Than 2-Story Houses**

The small-house survey, covering typical details of construction and equipment, in small dwellings in 38 cities of the United States, with exact summaries on these details for 31 cities, is the basis of a report to be published later on in the year by the division of building and housing.

The cities chosen for the study were well distributed over the United States. In this systematic study of recent trends in small-dwelling construction, data were obtained on approximately 400 details of construction and equipment to indicate trends in dwelling-house style, installation of improvements and conveniences, room sizes, ceiling heights, and materials used for frame and finish.

In releasing the findings from the survey, the division of building and housing makes no claim that it portrays average conditions throughout the country. It merely publishes the data for the representative houses visited.

### Division chief makes address.

In an address delivered last month before the builders' and subdividers' division of the New York State Association of Real Estate Boards, James S. Taylor, acting chief, division of building and housing, discussed a number of the findings.

"A great variety in type of architecture was found," he said, "with the English house very popular. Thirty-four houses of this type were included in the list. Forty-nine houses were capable of no exact classification as to type of architecture; 12 were Spanish; 11 Colonials were in the list, and it is surprising to note that only three of these were Dutch Colonial, which would not correspond with conditions a few years ago."

"Of 106 single houses, 54 were 1-story bungalows, 10 were story-and-a-half bungalows, and 40 were 2-story houses. Two contained two and a half stories.

On bungalows the most common number of rooms were five on the first floor; and the greater part of the group were in the classification between four and a half and five and a half rooms. For 2-story houses the most common type were three rooms on each floor. (In counting the rooms, a separate breakfast room has been counted as half a room.)

### Average price of house \$9,487.

"The average total price of 69 detached houses for which this figure was available, was \$9,478. The average lot price for the group was \$2,016, making an average percentage of lot to the whole of 21.3. Individual cases vary greatly from this average, but the average of individual percentage of lot value to total value checks the figure very closely. The average lot width for 81 detached houses was 49.3 feet, and the average depth 132 feet, the most common dimension being 50 feet for width and between 120 and 130 feet for depth.

"Bungalow prices were lower and showed a smaller range in price than 2-story houses, the average price of 33 bungalows without lots being \$5,028. For 5-room bungalows this average was \$5,176, while for the typical 6-room 2-story house the average price was \$6,744, without land.

"The average house width for all detached houses, including porches, was 31.1 feet. Subtracting this from the average lot width of 49.3 feet leaves an average clear space of about 18 feet. Individual percentages check this figure very closely. The average setback of detached houses was 27.1 feet, and the most common street width was 50 feet. Only 28 per cent of the streets on which these representative moderate-priced houses were located were without paving, and the paving was usually paid for by the developer."

## AUTOMOBILE BUMPER HEIGHTS REVISED

**S. A. E. Reviews Present Specifications; Recommends Number of Changes**

As a result of the lowering of car frames, the subdivision on passenger car bumpers of the Society of Automotive Engineers' standards committee has reviewed the present specifications for bumper height and recommends a number of changes, according to a recent number of the magazine, *Automotive Industries*.

"In the past," says the announcement in *Automotive Industries*, "the bumper height has been measured with the car empty except for supplies, but it is now recommended that the nominal height as specified in the standard shall be the mean between the actual height with the car empty and with the car carrying a full passenger load."

"It is further recommended that the horizontal center line of the bumper face, exclusive of fittings,

shall be 17 inches, plus or minus one-eighth inch per inch of effective face, above the ground for front bumpers, and 17 inches, plus or minus one-fourth inch per inch of effective face, above ground for rear bumpers or fender guards. The point where the face of the bumper is to be measured is specified as follows: The vertical spread of contact face of bumper assemblies is the distance between the upper and lower edges of the bumper impact bar or bars, and shall be measured at the extreme outer end thereof.

"Since it is considered important from the standpoint of appearance that bumpers be set at the proper angle and bumper pads are now generally machined on the spring horns, the subcommittee recommends the following additions to the present bumper specifications: The faces of the mounting pads for the front bumpers shall be perpendicular to the ground when the car is unloaded. The faces of the mounting pads for the rear bumper shall be perpendicular to the ground with the car fully loaded."

# PAPER BEST ADAPTED TO RETAIN STAMPS IS OBJECT OF TESTS

## Work of Paper Laboratory Results in Other Interesting Developments

Experiments looking to the perfection of paper which will best retain postage stamps constitute a major part of laboratory work in the general paper field. Papers surface sized with starch or rosin are the principal offender as regards the shedding of stamps, according to the bureau.

### Investigation of postage stamps.

The study of resistant envelopes has been continued. The object is to find, if possible, the factors that have the most important effects on the adhesion of stamp gum. Several thousand envelopes taken from the incoming mail have been examined and the most resistant types are being studied, particular attention being given fiber composition, surface finish, nature of sizing, and degree of sizing. Results indicate that the adhesion of stamp gum depends in no way on the fiber composition, but that it does depend on the nature of the sizing material, degree of sizing, and surface finish. All papers surface sized with starch sizing have been found extremely resistant.

Nearly all of the other resistant papers found were high-finish bond papers having a high degree of rosin sizing. It is believed that these two types of papers are the principal offenders as regards the shedding of stamps. Various modifications of the stamp gum are being tried in an effort to develop a gum that will stick to all types of paper.

### Moisture content of felt rags.

Arrangements have been completed for finding the moisture content of the various grades of rags used for making roofing felts and other similar products at different humidities. This work is to be done in cooperation with the technical committee of the Felt Manufacturers Association and was undertaken at their request. They require the data to fix an equitable moisture-content basis for purchase specifications. The moisture content of 50 samples of rags will be determined at a constant temperature of 70° F. and at relative humidities of 50, 65, and 98 per cent.

### Deterioration of paper.

Chemical accelerative factors in the deterioration of paper are apparently acidity of paper and air in contact therewith, oxygen, and catalytic effect of the paper itself. There is some evidence that paper deterioration is autocatalytic in nature. Because of these last two factors it is important to know the relation between the measured area of a piece of paper and the actual (contour) surface of paper which this measured area represents. A method for determining this ratio has been devised and preliminary tests yield promising results.

For every cubic foot of air in contact with paper there are apparently 70,000 times as much oxygen surface as true paper surface, which increases the probability of catalytic effect of paper surfaces in contact with deteriorative gases. Specimens for cross-section photomicrographs as well as a special device for measuring contour surfaces are in course of preparation.

Tests were made on three rosin-sized papers having various degrees of acidity. The papers were made in the bureau's experimental paper mill from purified wood fibers. Runs 766, 771, and 722 were identical except for the hydrogen-ion concentration of the stocks which were 4.4, 5.5, and 6.5, respectively, at the head box. The regular physical and stability tests were made, also the usual chemical tests.

It was found that sample 766, having the highest acidity, is also the least stable of the three papers. Lowering the acidity was found to have increased the stability markedly. Evidently, it is extremely important to control carefully the pH of stock for permanent papers. Only the smallest amount of alum necessary for the required sizing quality should be used. It is probable that commercial mills could improve the permanence qualities of their papers, by regulating the acidity more carefully, and without losing sizing quality.

Sample 771, which had an acidity of 4, and pH of 5.5, much lower than usually encountered in commercial papers, was remarkably resistant to the heat test, and yet was satisfactorily sized. Sample 772, even more stable, did not appear to be sufficiently well sized. Therefore, 5.5 is probably about the right hydrogen-ion concentration in this type of stock to obtain the best combination of sizing quality and stability.

### Dirt count of rag half stuff.

As an aid in minimizing the dirt content in the finished paper, it is common mill practice in the manufacture of fine wood-fiber papers to make test sheets of the wood pulp and count the dirt specks in a given area. In the case of rag fiber as prepared for beating, commonly termed "half stuff," such determination is more difficult, as owing to the comparatively greater length of the unit constituents of the material, it tends to form a lumpy and irregular test sheet.

At the request of a rag paper manufacturer, experiments were made on the preparation of a suitable test sheet. It was found that the half stuff could be defibered sufficiently in water, with a high speed agitator, to permit the formation of a satisfactory sheet with the ordinary type of test-sheet mold.

### INDUSTRY TO SIMPLIFY CASTERS

The division of simplified practice is still collecting data on the production and demand of large industrial casters, in nominal sizes of 2½ to 6 inches, inclusive. The majority of the manufacturers now favor a simplification program. As soon as figures have

been received from manufacturers representing at least 80 per cent of production the division will arrange a second preliminary conference for the purpose of appointing a simplified practice committee, to have charge of formulating the simplified list of stationary and swivel casters.

## THE INDIVIDUAL CITIZEN AND SIMPLIFIED PRACTICE

**Profits Are in Turnovers and Not "Shelf Warmers"; Simplified Practice a Means to This End; Industry Has Already Effected Many Programs of Interest to Housewives and Business People**

By S. F. TILLMAN

The greatest construction project of ancient times—the Tower of Babel—was frustrated by a confusion of tongues. Manpower and materials there were available in plenty, and the plans of the builders remained unchanged. But when these plans and instructions could no longer be communicated from one workman to another, accomplishment became impossible and the undertaking had to be abandoned.

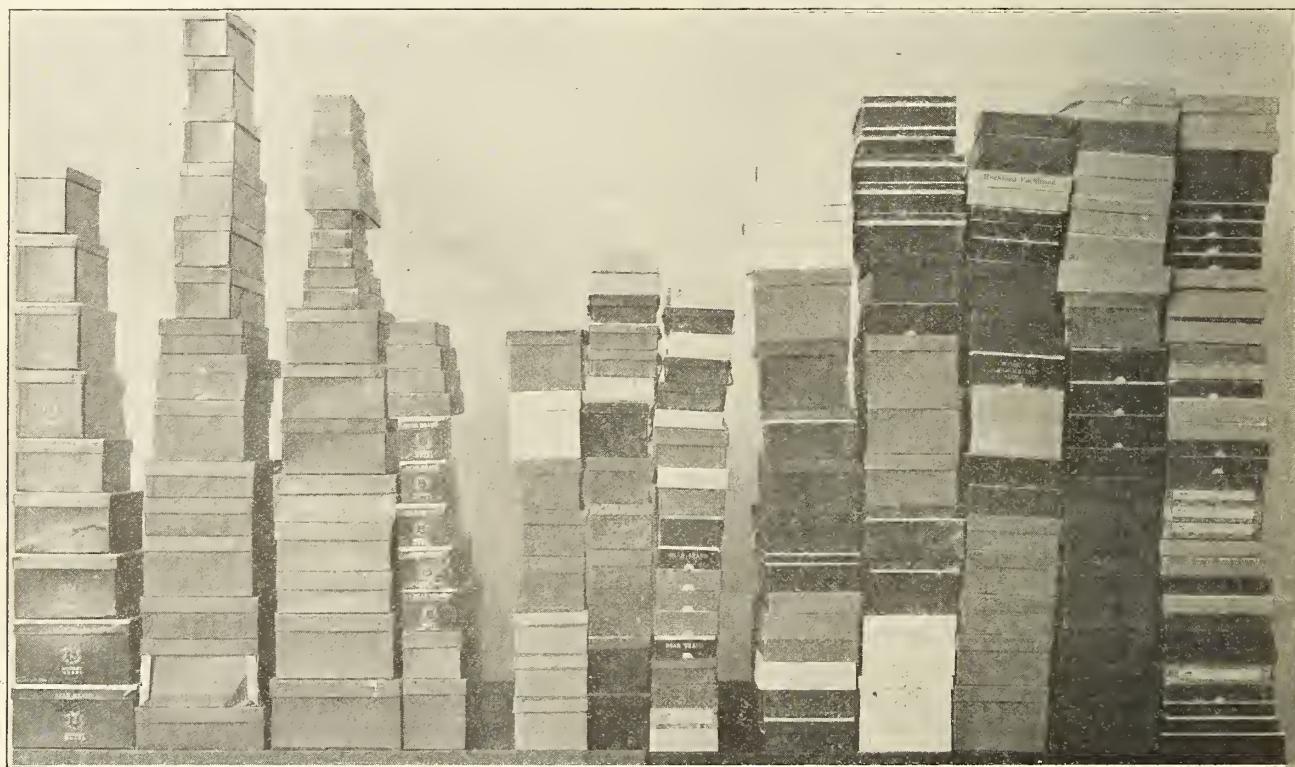
One would hardly expect to find any such lack of coordination, especially in daily commerce and trade, existing in this day of modern business methods. It does exist, however, and to it may be charged, in a large measure, the unnecessary high costs of doing business. While the difficulties encountered by Am-

as to offer no distinctive value to either the manufacturer or the consumer. . . .

Industry is now eliminating "excessive variety in production," by concentrating both manufacturing and selling efforts on those varieties that, because they are in greatest demand, will adequately serve the major demands of the trade. This elimination process is called simplified practice. In order to be successfully carried out, it requires the cooperative efforts of the manufacturers, distributors, and users.

### Merchants overstock.

Through this overdiversified manufacture of staple products, the shelves of the merchants have become



*Collection of hosiery boxes showing large variety in container sizes prior to standardization*

erican business men in their dealings with foreign business men can readily be appreciated by the individual citizen, due to the difference in tongues, it is hard for one to visualize a similar difficulty existing in these United States between the manufacturer and the buyer.

### Industry produces too many varieties.

This confusion or lack of coordination, is the result, in part, of industry producing "too much variety" in the staple articles that associate themselves with us in our daily life. "Too much variety" in production makes for waste in industry. It also hinders the purchasers from making better selections, due to the maze of varieties offered, the variations often being so slight

laden with articles that do not sell. They gather dust, rather than dollars. This waste, avoidable waste, if you please, concerns the pocketbook and living conditions of every man, woman, and child, from the salaried man to the capitalist, and this article is intended to give the readers of the COMMERCIAL STANDARDS MONTHLY a glimpse, "back stage," of what the National Bureau of Standards of the Department of Commerce is doing to help industry eliminate waste, through the application of the principles of simplified practice.

While it is true that no single individual, be he manufacturer, distributor, or user, has the power to materially change the situation; nevertheless, through the cooperative efforts of the various elements of an

industry, all working toward the same end, much can be accomplished.

In talking about "too much variety" in manufacture, it may surprise some of the readers to know that the experience of the division of simplified practice of the bureau has been that, prior to applying simplified practice, 80 per cent of the business is generally done on 20 per cent of the varieties produced. The remaining 80 per cent of the varieties, serving only one-fifth of the trade, eats up the profits from the so-called "quick sellers."

#### Simplified practice reduces the varieties.

A further emphasis may be given the meaning, or the purpose and value of simplified practice, by illustrating examples. Reference herein is made to several simplifications covering commodities of interest to every family. The first examples were enacted by the industry without the aid of the bureau.

Only a few years ago industry was producing 179 different electric-light bulb bases, which necessarily had to have 179 different sockets into which to fit, for none were interchangeable. After the line was simplified, industry concentrated on six standard bases simplified, industry concentrated on six standard bases, completely eliminating 173 styles. The consumer can readily appreciate the convenience resulting from the simplification of this item. One can now buy bulbs and lamps without having to know the first, middle, and last names of the particular light socket they require. The manufacturer also has less trouble, for he can now produce a few sizes in larger quantities, which means better production methods and lower prices.

In the same connection, a reduction has been also effected in the number of attachment plugs, from 37 to the 1 standard plug, with parallel blades which fit any device now made. Electric light bulbs have also been reduced in variety of style, size, and kilowatt hour capacities, from 45 to 5, with a reduction in price from \$1.10 per bulb to 25 cents per bulb.

#### Simplifications under auspices of bureau.

Commodities that have been simplified under the auspices of the division of simplified practice, include bed sizes, milk bottles and caps, bedsteads, springs and mattresses, woven-wire fencing, kitchen range boilers and tanks, bed blankets, etc.

Varieties of several containers, of interest to the housekeeper, such as salt packages, preserve jars, paper grocers' bags, etc., have also been simplified. This has made for greater convenience in purchasing as well as in handling the packages in the kitchen and the storing of them in the pantries. By having a uniformity in the sizes, shapes, and capacities of the containers coming into the kitchen, the housewife can have a more systematic arrangement of the items and at the same time effect greater utilization of the empty containers.

It is to be noted that simplified practice has nothing to do with matters of fashion, creative styles, or the individual artistic concept. In no way does it restrict improvements in manufacturing methods or the progress in invention. Nor does it attempt to suppress or submerge individuality. Its object is not the creation of a rigid régime of so-called standardization, where there is no regard for beauty or art. In no way does it limit the opportunity of the individual to secure those things which satisfy cultural desires.

#### Programs promulgated voluntarily.

The development of a simplified program, or a simplified practice recommendation, is entirely voluntary on the part of an industry. There is no law making it compulsory for industry to do this. The readers will naturally wonder why this elimination of excessive variety has not always been in effect.

While many individual concerns have applied simplification principles to their own products, it should be borne in mind that in developing a simplified-practice recommendation under the auspices of the National Bureau of Standards, it is necessary that all interested elements of the industry cooperate in working out the schedule. The Department of Commerce will not indorse any simplified-practice recommendation until it has received the acceptance and support of at least 80 per cent of the industry, based on annual volume of production.

#### Movement started in 1921.

A brief reference to the birth of the simplification movement in industry, under the auspices of the division of simplified practice, should be of interest. In February, 1921, a committee of 17 engineers, headed by Herbert

Hoover, met in Syracuse, N. Y., and mapped out "a survey of waste" then existing in American industries. When in June of that same year the committee published its report it focused the attention of industrial leaders and management experts on the appalling wastes then existing in manufacturing and distribution methods. This committee, "The Committee On Waste In Industry," selected six major industries which they believed would present typical conditions and found that the wastes were approximately as follows:

Metal trades, 29 per cent; boot and shoe manufacturing, 41 per cent; textile manufacturing, 49 per cent; building, 53 per cent; printing, 58 per cent; men's clothing, 64 per cent; the average being 49 per cent waste.

Practically one-half of the material, labor, energy, and human effort expended in these industries was lost, or wasted: that is, spent without tangible return. If the waste factor of these six industries was typical of all the industries in the United States, with their annual output of more than \$60,000,000,000 of manufactured goods, there was clearly a tremendous unnecessary cost to the user, who obviously bore the loss

### THE ULTIMATE CONSUMER PAYS FOR IT ALL

Since we are all consumers we should cooperate to eliminate waste in production, distribution, and consumption as the means of reducing our own costs.

in the long run. It was recognized that all of this waste was not avoidable; some of it could never be overcome, but experience in various industries has since proved that the total could, and has, been reduced. The major causes of waste in industry was found to be: Low production due to faulty management of materials, machinery, equipment, and men; interrupted production caused by idle men, idle materials, idle plants, and idle equipment; restricted production intentionally caused by owners, management, or labor; lost production caused by ill health, physical defects, and industrial accidents.

#### **Management responsibility placed at 50 per cent.**

In assaying the relative responsibility for these wastes, the committee found that 50 per cent of the responsibility could be placed at the door of management, 25 per cent at the door of labor, with the rest chargeable to outside contacts or conditions, which neither management nor men could control. Management had the greatest opportunity, hence, responsibility, for the elimination of waste in industry.

Following this report on the existence of waste in industry, the application of the principles of simplified practice, as an effective eradicator of this waste, followed. The principles were not new, being as old as the world itself, but their application were being used in a different manner.

That this is a simple and yet effective method of reducing too much variety, in manufacture, is evidenced by a recent report of the division of simplified practice covering a review, or audit, of nine of the simplified practice recommendations. These audits were made during the second quarter of 1929.

#### **Average adherence is 89.81 per cent.**

Through this report the division stated that the average support given each of these programs was 89.81 per cent. In other words, of the total products manufactured by the acceptors of the recommendations during the period under survey, 89.81 per cent were of the "simplified variety." This amply demonstrates why industry has welcomed simplified practice as one of the most significant economic and industrial movements of the day.

These annual or periodical audits afford accurate indexes of consumer demands, and are a reliable basis upon which industry can build for mass production. In this connection it is interesting to note that the division is the only organization engaged in waste elimination, through simplification, which makes this annual factual review of the extent of usage which its recommended practices are put.

In addition to judging the extent of the adherence accorded the programs, the annual review also provides the industry's standing committee with the means for changing the program to keep it abreast of progress in the art, due to invention, improvement of methods, and changing trend of consumer demand. The benefits that result from the concentration of manufacture and sales efforts on the simplified line, may very properly be discussed in three classes. Those for the user or consumer, those for the distributor, and those for the manufacturer.

#### **Consumer's gains.**

By buying the standard or simplified variety and sizes, the users may expect better prices than other-

wise possible, better service in everyway, and lastly, but not least, better quality due to ability of manufacturers to concentrate on better design and methods of production.

#### **Distributor's gains.**

Through adoption of simplified practice the wholesalers and retailers may expect increased turnover of stocks due to elimination of the slow-moving items, easier to buy and sell, and a more effective sales force by concentration of effort; decreased investment in stock, repair parts, and storage and operating space; decreased overhead and depreciation; and better service, lower prices, and quicker deliveries.

#### **Gains to the manufacturers.**

The manufacturers' gains are: Less capital tied up in stock, special machinery and repair parts; more economical manufacture made possible through reduction of various items to be manufactured, which permits more time for study to produce better methods, reduce overhead; higher individual production and reduced clerical records; more efficient labor, due to greater ease of training employees on smaller number of tasks, better earnings made possible by greater skill acquired through production of same unit more often; and steadier employment due to increased output; general gains include better service to the trade, increased turnover, easier application of sales effort to smaller list of items; easier financing and better individual attention where it is needed, either in manufacturing, service, or selling.

#### **Industry has effected 114 programs.**

So far industry has effected a total of 114 simplified practice recommendations under the auspices of the division of simplified practice. A list of these programs may be secured, without cost, by addressing the chief, division of simplified practice, National Bureau of Standards, Washington, D. C.

The average citizen, as a consumer, has an important part in making simplified practice a success, and in determining the extent to which it should be used. He or she, as the case may be, should get acquainted with the value and benefits of simplification, and talk the thing over with the neighbor and fellow-club members. Still another responsibility in the movement rests upon every purchaser of staple goods. Cooperating with the manufacturers and the merchants, by encouraging simplified practice and specifying the simplified lines when buying, will be a great stimulus to economical production and efficient service.

A demand for something special, when a standard article will completely fill the need, and adopting a noncooperative attitude, when the merchant explains the situation, will not help to lower prices or increase service and our standards of living. On the other hand, an effort to select one or more of the suggested standard varieties will be the best method to pave the way for the further practice of simplification and subsequent benefits to the user and others concerned.

So, as through our daily purchases, we encourage the elimination of the unnecessary variety in the goods that go to satisfy our daily needs, we hasten the elimination of waste in industry. As these wastes decrease, the purchasing power of our dollar is bound to increase.

## SAW INDUSTRY ANNOUNCES SIMPLIFICATION PROGRAM

**Saw Manufacturers Join Lumber Industry in Working for Simplification; Proposed to Confine Manufacturers' Stocks of Finished Saws to Standards in Most Demand**

The saw manufacturers of the country, according to an article in the magazine, Wood Construction have definitely joined the lumber industry in its work for standardization and simplification of product. For some months a committee of representative saw manufacturers has been studying the needs of the lumber industries throughout the country, and after carefully considering the best current mill practice they are now publishing lists of standard band and circular saws for wood cutting.

It is proposed to confine manufacturers' stocks of finished saws to these standard items which are generally in demand with approximately 90 per cent of the trade. The object is to maintain stocks of finished saws which will always take care of customers' standard requirements promptly. In the past when there was an attempt to carry in stock almost an unlimited variety it actually proved impossible to have stocks capable of servicing customers except at the expense of excessive investments.

## SAVINGS EFFECTED BY STANDARDIZATION OF PAPER AND PRINTING

**Practice Declared to Promise Great Reduction of Expense and Waste for Entire Industry**

Savings effected by individual firms through the standardization of their paper and printing have been such as to prove that enormous savings would result from national standardization in this connection, according to G. A. Renard, secretary of the National Association of Purchasing Agents.

Many firms have simplified and standardized their paper and printing, with savings in some instances as high as 40 per cent. This elimination of waste has the active support of many of the most representative printers and paper suppliers; in fact, much of this saving can be directly attributed to the recommendations and cooperation of progressive and efficient producers and distributors. If individual consumers can effect such savings, the savings brought about by a national standardization of paper would be enormous. But here, also, the movement must have the cooperation of the paper suppliers to be effective.

"We must agree that the savings to be made are the real incentive for the undertaking," declares Mr. Renard, and it can only be successful if these savings are distributed. The papermaker or distributor is not interested unless he can profit, and that is also true of the purchaser. Failure to allow both the producer and the consumer to profit will bring failure, as it has so often before.

"Producers in other lines are offering considerable resistance to elimination of waste, by refusing to share the savings on the theory that nonstandard materials must be produced and distributed to those consumers who refuse to accept the standard materials. By adopting this attitude they are penalizing the consumer who does accept standardization in favor of the one who does not."

## Opposite policy advised by Renard.

"Just the reverse should be done. When the producer recommends certain materials as standard because they can be produced most economically and serve the consumer properly, those who accept the standardization should be permitted to share in the savings made; those who do not should pay the full cost of the nonstandard items. This is true of special and distinctive paper required for advertising. Nonstandard material has a great value in this field, and, because of its value, it will continue to be produced and can carry the cost of its production. If paper standardization is promoted in this way, everyone contributing to its success will profit very handsomely; if it is not approached with this intention, it will not be successful."

"The purchaser is interested in securing the greatest value in paper, as in every other commodity. If his cooperation is secured it will be through giving greater values either by lowering prices, or increasing quality. This can be done very easily if the producers and distributors will make a sincere contribution to the movement. This we should expect from previous activities by the most representative ones."

## Users should be consulted.

"Every effort should be made to permit the vendors to contribute their knowledge and experience in a determination of what papers and sizes are most economical from their viewpoint. The user should determine what he wants the papers to do and allow the manufacturer to determine the best and most economical papers to secure the performance required."

Such cooperation will result in very great savings that can be distributed to all concerned. Those who are unwilling to cooperate in such work must admit they would rather profit by waste and inefficiency, than by real service.

The Government (the National Bureau of Standards) can depend upon the purchasing or consuming interests to support this movement, and its success will depend entirely upon the amount and kind of support given by producing and distributing agencies who should have just as great an interest in, and reward from, its fulfillment.

## DUCKPIN BALLS USED TO STUDY EFFECT OF TURBULENCE ON WIND-TUNNEL MEASUREMENTS

The bureau in cooperation with the National Advisory Committee for Aeronautics has made further progress in the standardization of wind tunnels, so that the designers of aircraft may be able to interpret the results of model tests, irrespective of the particular tunnel in which the tests are made. Such diverse objects as a fine platinum wire, one-third the diameter of a human hair, and standard tenpin and duckpin balls have found application in the investigation.

It has been found that wind tunnels differ in the amount of eddying motion or ripples superposed on the steady air stream of the tunnel, and that this turbulence has an important effect on the measured air forces of certain types of models, especially airship models. These ripples have been studied by their effect on the cooling of a very fine electrically

heated platinum wire, the variation of which is amplified and measured. The current may be passed through a loud speaker and the eddies "heard," if desired.

It was found that the air resistance of spheres was very sensitive to the amount of turbulence and could be used to measure turbulence after the laws of the variation had been established by the hot-wire apparatus. For this purpose, the standard duckpin and ten-pin balls which are spherical to a high degree of accuracy, are found quite satisfactory. They are, of course, easily obtained by any wind tunnel experimenter who wishes to measure the turbulence of his wind tunnel.

### STANDARD SYMBOLS FOR HYDRAULICS

The American tentative standard for symbols for hydraulics, prepared by a subcommittee of the general committee on scientific and engineering symbols and abbreviations, has been printed and is now available at 35 cents per copy, through the office of the American Standards Association, 29 West Thirty-ninth Street, New York, N. Y. G. E. Russell, professor of theoretical hydraulics, Massachusetts Institute of Technology, was chairman of the subcommittee which prepared the standard. J. Franklin Meyer, of the National Bureau of Standards, is chairman of the general committee which is working under the sponsorship of American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, Society for the Promotion of Engineering Education, and the American Society of Mechanical Engineers.

### RAILWAY ENGINEERING STANDARDS AND SPECIFICATIONS

The sixth revised edition of the Manual of the American Railway Engineering Association, has recently been published by the association. It represents a compilation of the formal conclusions, to and including the 1929 annual convention, of the A. R. E. A., covering principles, definitions, designs, specifications, and recommended practice for economic location, construction, maintenance, and basic physical elements of operation of railways. In addition to the specifications relating to the construction, maintenance, and operation of railways, the manual contains standards and specifications for masonry, water sewer and sanitation, iron and steel structures, wood preservation, electricity, standard contract forms, construction of buildings, and wooden bridges and trestles.

### NEW DRAFT OF SAFETY CODE FOR MECHANICAL REFRIGERATION PROPOSED

A complete new draft for the proposed American Safety Code for mechanical refrigeration has just been completed by a subcommittee and is being submitted to the sectional committee responsible for the code, which is being prepared in accordance with American Standards Association procedure, under the sponsorship of the American Society of Refrigerating Engineers.

In this new draft of the code, full advantage has been taken, according to the office of the American

Standards Association, of the new data and experience developed as a result of a recent unfortunate series of accidents with multiple installation of refrigerators in the Chicago area. The code has been completely rearranged, and in the new draft is dealt with under four principal headings—single unit, installations, particularly in homes; commercial units; multiple installations; and commercial refrigerating machinery. The section of the code dealing with multiple installations is new and is being presented as a satisfactory solution of this much-discussed subject.

### STANDARDS FOR DIAMOND CORE DRILL FITTINGS

#### Commercial Standard Indorsed by Industry; Insures Interchangeability of Fittings

A circular letter was disseminated on September 6, announcing receipt of signed acceptances representing between 85 and 90 per cent of production by volume of diamond core drill fittings, thus assuring success of the commercial standard on this commodity, according to the division of trade standards.

Manuscript has accordingly been prepared and forwarded to the Government Printing Office, for printing under the title, "Diamond Core Drill Fittings, Commercial Standard CS17-30."

This commercial standard covers terminology, size designation, dimensions, and tolerances for drill rods, drill-rod couplings, core barrel bits, casings, casing couplings, and casing bits, used in diamond core drilling, in order that these fittings may be made interchangeable as produced by the various manufacturers, thus facilitating replacement or extension of equipment and, in general, making it possible for the producers to better serve the drilling contractors and users. Diamond core drills are used extensively by oil companies, mines, etc., often in remote sections of the country. Operators of drilling outfits are often put to serious inconvenience and delay because the particular make of fittings required for their outfit can not be obtained readily.

Manufacturers of these drills, wishing to facilitate the replacement or extension of equipment, to lower stock, and to gain other advantages of standardization, decided to provide complete interchangeability of mating parts. The Diamond Core Drill Manufacturers Association requested the assistance of the National Bureau of Standards in its standardization program. The recommendation, as prepared by the association and adopted by a general conference on May 27, 1929, has since then been very generally accepted by the industry. The standard, as adopted, covers four sizes of drill rods and casings, casing couplings, and core barrel bits for obtaining cores approximately  $2\frac{1}{8}$ ,  $1\frac{5}{8}$ ,  $1\frac{1}{8}$ , and  $\frac{7}{8}$  inch in diameter. The dimensions and tolerances set forth will be used as the basis for a system of careful gaging to insure interchangeability.

A representative standing committee was appointed to review suggested revisions in order that the standards may be kept abreast of progress in the industry. The standard is to become effective for new production January 1, 1930, and existing stocks of non-standard items are to be disposed of by July 1, 1930.

## STANDARDIZATION OF CLOCK SPRINGS PRESENTS DIFFICULTIES

"Standardizing of springs presents many difficulties because of the varying demands for different lengths, sizes, and strength," says John R. Godfrey in his column "Seen and Heard," appearing in the American Machinist. "Mainsprings for 8-day clocks are, however, practically standardized," he said, adding that "as far back as 1860 one spring company began making springs for 8-day clocks that were three-fourths inch wide and 0.017 inch thick, and these springs are still standard for 8-day clocks. Perhaps the solution of the standardization of many similar products might be to accept the practice of old-time manufacturers where their product is widely used, probably after weeding out the inconsistencies."

"Most of us would prefer dimensions that seem rational, that have fairly regular increments, and are in even figures where possible. But the main object of standardization is uniformity of product and not ideal dimensions. And while we would much prefer to use 0.25 inch instead of 0.231 inch, the exact size really makes little difference if we can depend on the new part giving the same performance as the old, whether it be a bolt or a clock spring. The application of large quantities of common sense is a great attribute for members of a standardizing committee, no matter what the product may be."

## IMPREGNATED PAPER CABLE

### Proposed Standard Specification for Impregnated Paper-Insulated Lead-Covered Cable

A draft of the proposed standard specification for impregnated paper-insulated lead-covered cable has been prepared by a subcommittee of the general committee on insulated wires and cables, functioning under American Standards Association auspices. These specifications apply to all sizes and classes of impregnated paper-insulated lead-covered cables which are to be used in underground conduits for the transmission and distribution of electrical energy up to and including 15,000 volts rated circuit voltage.

The draft includes sections on the information to be supplied to the manufacturer of the cable by the purchaser, reservation on estimated quantity, conductors, insulation, sheath, marker, over-all diameter, insulation resistance, dielectric power factor, maximum operating temperature, and test requirements. The specification also outlines the tests to be made on each length of cable. These tests are conductor resistance, high-voltage tests, and insulation-resistance test. Tests of samples and tests to be made after installation are also included, together with sections on reels shipment and miscellaneous items.

D. W. Rope, superintendent of the street department, Commonwealth Edison Co., Chicago, is chairman of the technical committee No. 5, which prepared this draft. The sponsors of the general wire and cables committee are: American Electric Railway Association, American Institute of Electrical Engineers, American Railway Engineering Association, American Society for Testing Materials, National Electrical Manufacturers Association, Association of Edison Illuminating Companies, American Railway Electrical Engineers, National Board of Fire Underwriters, National Electric Light Association, and National Fire Protective Association.

## SAVINGS FROM USE OF SKID PLATFORMS AND LIFT TRUCKS

"By the use of skid platforms and lift trucks a western railway is reported to have reduced the labor pay roll in its storekeepers' department by over \$15,000 a month," according to an article appearing in a recent issue of the Purchasing Agent magazine. "An analysis disclosed a reduction in handling brake shoes from 175 manual operations to 7 and in handling brake beams from 200 operations to 10."

"An automobile manufacturing company," the writer continues, "reported that their old method of unloading a car of crank shafts required eight men seven and one-half hours at a cost of \$24. They found that by means of skid platforms and lift trucks one driver and one helper could unload a car in 45 minutes at a cost of \$0.98."

"A western firm last year gave away to its customers 4,000 skids, at an approximate cost of \$10,000, knowing that the use of these skids by its customers would save it more than this in the stevedore pay roll."

"A paper company reports that loading a 50-foot box car of paper, which formerly took seven men three hours, can be accomplished on skids by two men in 45 minutes, representing a labor saving of 93 per cent."

## RECOMMENDED PRACTICE FOR POWER-PIPING SYSTEMS

### Proposed American Recommended Practice for Power-Piping System Set in Circulation by A. S. A. for Review and Criticism

The American Society of Mechanical Engineers, sponsors for the technical committee on the Code for Pressure Piping, under auspices of the American Standards Association, is circulating for review and criticism, the proposed American Recommended Practice for Power Piping Systems, which is section 2 of the code. The code covers the design, manufacture, test, and installation of power piping systems in steam generating stations, central heating plants, industrial process work, and all distributing systems where the pressure is in excess of 15 pounds.

Power piping systems are classified as all piping in the above-mentioned plants, with the exception of building heating (where the pressure does not exceed 15 pounds), roof and floor drains, plumbing and sewers. In addition to the general requirements for all power piping systems, the code covers specific mandatory requirements for (a) steam pressures from 250 to 1,350 pounds, and temperatures from 450° to 750° F.; (b) steam pressures from 125 to 250 pounds, and temperatures not in excess of 450° F.; (c) steam pressures from 25 to 125 pounds, and temperatures not in excess of 450° F.; (d) steam pressures up to 25 pounds and temperatures not in excess of 450° F.; (e) oiler-feed systems and hot-water systems over 250° F.; (f) blow-off piping; (g) service water and vacuum systems; (h) oil piping systems; and (i) air piping systems.

Edwin B. Ricketts, research engineer, New York Edison Co., is chairman of the general committee on code for pressure piping and John H. Lawrence, president, Thomas E. Murray (Inc.), is chairman of the subcommittee on power piping. Other subcommittees are at present working on hydraulic piping

systems, gas and air piping systems, refrigerating piping, oil piping, materials and fabrication details.

## SAFETY CODE FOR TEXTILE INDUSTRIES APPROVED

### **Code to Assure Safety of Life, Limb, and Health for Workers in Plants Approved by American Standards Association**

A code aimed to assure the safety of life, limb, and health for workers in all plants operating textile machinery and equipment has just been approved as American tentative standards by the American Standards Association. The code is intended for voluntary adoption and use as a standard by both manufacturers and users of textile machinery and equipment.

The National Safety Council assumed the leadership for the preparation of the code under the auspices of the American Standards Association. The actual preparation of the code was in the hands of a technical committee of 24 men representing not only the manufacturers and users of textile machinery and equipment, but also independent experts, representatives of Government departments, representatives of insurance organizations, and others. Charles H. Eames, president, Lowell Textile Institute, was chairman of the sectional committee and W. Dean Keefer, chief engineer, National Safety Council, was secretary.

Among the organizations represented were the National Association of Cotton Manufacturers, the National Association of Wool Manufacturers, the American Society of Mechanical Engineers, the International Association of Government Officials in Industry of the United States and Canada, the International Association of Industrial Accident Boards and Commissions, the United States Department of Labor, National Bureau of Standards, the National Association of Mutual Casualty Companies, the Silk Association of America, the National Board of Casualty and Surety Underwriters, and individual manufacturers of textile machinery.

The requirements of the code apply to such textile machinery and equipment as plants operating pickers, cards, combing machinery, drawing frames, slubbers, roving frames, ring spinning frames, spinning mules, spoolers, twisters, wrappers, slashers, looms, inspection machines, folding machines, baling presses, sewing machines, cloth singers, washing machines, kiers, mercerizing and tenter frames, mangles, winders, dry cans, dyeing peddlers, jigs and vats, color mixers, printing machines, soapers, aging boxes, pasters, dampeners, calenders, hookers, doublers, extractors, bottles, and other machinery and equipment used for similar purposes.

## **PROPOSED AMERICAN STANDARD FOR CUT AND GROUND THREAD TAPS**

### **Draft of Proposal Is Now in Circulation for Review, Says American Standards Association**

A draft of the proposed American standard for cut and ground thread taps is now being circulated for review and criticism, and copies are available for this purpose from the office of the American Standards Association.

The draft was prepared by technical committee No. 12 of the general committee on small tools and machine-tool elements, organized under the auspices of

the American Standards Association, with the Society of Automotive Engineers, the National Machine Tool Builders Association, and the American Society of Mechanical Engineers, as sponsors. Charles M. Pond, manager, small tool and gage division, Pratt & Whitney Co., is chairman of the technical committee.

The particular features of this new standard, according to a foreword to the standard, are (1) adoption of larger major diameters to allow for greater wear, (2) increase in minimum pitch diameters on cut thread taps over  $\frac{3}{4}$ -inch diameter to compensate for lead error, (3) adoption of a comprehensive standard for ground thread taps, and (4) standardization of a number of elements not heretofore covered. The standard covers machine screw end, taper, nut, and pulley taps. Standard tolerances on all dimensions are included.

It is understood that this proposal follows closely the tap standardization program set forth in the 1928 report of the National Screw Thread Commission, as carried out by that commission and its cooperating committees, representing manufacturers and users of taps.

## **SIMPLIFICATION OF SCREW JACKS**

The division of simplified practice has heard from a number of manufacturers of this equipment who favor a reduction in the present variety of sizes and styles. The division has also circularized a considerable number of shippers and large users, including railroad companies, all of whom strongly favor such reduction in variety. It is expected that a conference of manufacturers will be held in Chicago during this month at which a definite simplification program will be formulated.

## **SIMPLIFICATION OF CIGAR SIZES**

### **Survey Conducted by Industry to Ascertain Opportunities for Reducing Variety of Sizes Produced**

Several trade papers in the tobacco industry have manifested to the division of simplified practice their interest in a proposal for simplification which has been presented to the division by the secretary of a local retail tobacco dealers association.

This official suggests that the practice of manufacturers of cigars producing the commodity in a wide range of sizes is working a hardship on the retail merchant. He believes that not only the retail merchant is suffering but the manufacturers as well. He points out that in a great many cases three or four different sizes of a particular brand of cigars are made, the difference between the various sizes being so slight that the average smoker can not discern it. There is also a wide and unnecessary diversification in colors of cigars, added the secretary, pointing out that the filler and binder give the cigar its character, but that the use of a wide variety of wrappers has created a misconception on the part of the smoker so that he now believes that, for example, a light-colored cigar is a mild one, whereas it may be just the opposite.

It has been stated that at one time a prominent cigar company manufactured as many as 20 brands of cigars, with 8 to 10 sizes for each brand, but since they have confined themselves to approximately three sizes per brand, they have increased their business enormously.

The concensus of opinion is that there are too many sizes of cigars on the market to-day, and that a reduction in the number of sizes would be of material benefit to all concerned. A member of the staff of the division of simplified practice is going to interview executives of several of the large tobacco companies in the near future with regard to the possibilities of applying the principles of simplification in this industry.

### KRAFT SEALING TAPE

**Simplification for Commodity Approved; Effective Date Set for February 1, 1930**

A large and representative conference of manufacturers, distributors, and users of Kraft sealing tape, held under the auspices of the division of simplified practice in Chicago last month, approved a simplified schedule of stock sizes for the commodity. The program is to be considered in effect on February 1, 1930, subject to the approval of all interests. This type of tape is known as No. 1 Kraft sealing tape and is largely used for sealing cartons used in shipments.

The program results in a reduction of 8 current weights of paper stock to 3 and these are 35, 60, and 90 pound paper before gluing. The recommendation also provides for the length of tape in rolls, the widths of tape for each weight, as well as packaging and marking. The test requirements for 60-pound tape are included, as this grade is specified by carrier and carrier organizations for use on fiber and corrugated shipping containers. The varieties retained will, in the opinion of those concerned, satisfy the normal requirements of the industry.

The conference approved the appointment of a standing committee to consist of representatives of manufacturers, distributors, and users for the purpose of enlisting the support of all concerned to maintain interest and adherence by keeping the program abreast of current practice through periodic revision. The program is to be made effective beginning February 1, 1930.

The division of simplified practice will shortly send to the members of the sealing-tape industry a copy of the report of the conference, together with an acceptance blank. When sufficient signed acceptances, representing at least 80 per cent of the industry by volume of annual production, are received, the recommendation will be printed as part of the Elimination of Waste series of the Department of Commerce, in accordance with the regular procedure of the division of simplified practice in its cooperative work with industry.

### TWO NEW PROPOSALS FOR SIMPLIFICATION

**Contemplated Programs Cover Arbor Holes for Saws and Grinding Wheels and Hydraulic Jacks**

The division of simplified practice receives many suggestions for simplification. A few of these are listed below. Manufacturers, distributors, and users of these commodities are invited to submit any comments which will be helpful in determining the interested industry's attitude toward these suggestions.

*Hydraulic jacks.*—A manufacturer of hydraulic jacks has suggested that there is a definite need for simplification in this field, particularly as to the range of capacities furnished. The division expects to get in touch, during the next month, with other manu-

facturers of hydraulic jacks, and with large users, to ascertain their opinion as to the possibility of reducing the variety now made.

*Arbor holes for saws and grinding wheels.*—The saw simplification committee, composed of representative manufacturers of saws, has suggested that the number of shapes and sizes of arbors can be very greatly reduced, to the benefit of everyone concerned. They have taken up the matter with the division, and it has also been brought up by the Grinding Wheel Manufacturers' Association. The division expects to get in touch with the manufacturers of portable electric machines on which these arbors are used, and to cooperate with all interests in developing a simplified practice project which will result in concentrating production on those sizes and shapes which are in greatest demand.

### ADHERENCE TO SIMPLIFICATIONS SHOWN BY SURVEY

Periodic surveys of production are conducted by the division of simplified practice to determine the degree of adherence which various industries are according their simplified practice recommendations. Such surveys recently conducted on several programs indicated that the adherence amounted to the following percentage of the 1928 production:

Simplified Practice Recommendation No. 10, Milk Bottles and Caps, 78.54 per cent; No. 63, Metal Spools, 43 per cent; No. 66, Automobile Brake Lining, 78.93 per cent; No. 67, Roller Bearings, 58 per cent; and No. 70, Salt Packages, 94 per cent.

By these surveys, current practice is also readily ascertained and these recommendations are kept serviceable. Many constructive suggestions as to further eliminations or additions to these programs were also received. These will be given full consideration by the members of the respective industries at the next revision meeting of the respective programs.

### LISTS OF SIMPLIFIED SIZES AVAILABLE

**Complimentary Copies of Simplified Practice Recommendations Available Upon Request**

To acquaint American business men with the various simplified practice recommendations now in effect, the division of simplified practice announces the availability of complimentary mimeographed schedules of these recommendations.

These mimeographed schedules, called sheet forms, contain the recommended list of sizes and varieties only, as adopted by the industry concerned, and are especially designed for use of engineers, architects, purchasing agents, the personnel of order departments, storekeepers, accountants, foremen, and others who are desirous of possessing, in concise form, schedules which are easily adaptable to their filing systems. A sheet listing the names of all simplified practice recommendations now in effect will be mailed those interested in securing copies of these recommendations in sheet form. From this list recommendations of particular interest may be selected.

Several thousand copies of these mimeographed sheet forms have been distributed during the past several months, and as great benefits may be derived from the application of these simplified practice

recommendations, it is expected that those engaged in commercial and industrial pursuits will be quick to avail themselves of this service.

### MASONRY OPENING SIZES

#### Meeting of Simplified Practice Committee on Masonry Opening Sizes Addressed by Secretary of Commerce; Subcommittee Appointed to Draft Tentative Recommendations

"Economy in the building and construction industries is more necessary now than ever before," said Secretary of Commerce Robert P. Lamont in an informal address of welcome to the members of a simplified practice committee on masonry opening sizes, at a meeting held at the Department of Commerce last month under the auspices of the division of simplified practice.

Outlining the services which the Department of Commerce has to offer the industries in the matter of the elimination of industrial waste for better economy in building operations, the Secretary said that "it is often necessary for the component elements of an industry to compromise on questions of minor importance in order that they may effect simplification or commercial standards programs which will be of benefit to the whole industry as well as to the entire country." He further stated that "the Department of Commerce, through the division of simplified practice of the National Bureau of Standards, is ready to support industry on any program that meets with the approval of the majority of that industry."

It was the concensus of opinion of those present, in discussing the subject of a standard unit dimension for masonry, that the fundamental or "key" building unit was embodied in the brick. It was accordingly suggested that a brick plus a mortar joint be established as a unit of measure, the length of the brick to equal a unit minus one joint; the width one-half unit minus one joint; and the thickness being one-third unit minus one joint. For the purpose of these considerations, a mortar joint was taken to equal one-half inch.

Leroy S. Kern, representing the American Institute of Architects, who was elected chairman of the committee, has informed P. H. H. Dunn, of the division of simplified practice, that he will shortly appoint a subcommittee, which will consist of one representative each from the face-brick manufacturers, the common-brick manufacturers, and the Associated General Contractors of America. It will be the duty of this subcommittee to prepare a report in the form of a recommendation as to some standard dimensional unit, such as suggested at the conference held last month. This recommendation, necessarily tentative in its nature, will subsequently be referred to all those interested in the subject for their consideration and criticism.

### THREE SIMPLIFICATIONS REAFFIRMED BY INDUSTRIES

The division of simplified practice announces that three simplified practice recommendations, No. 9, Woven Wire Fencing; No. 80, Folding and Portable Wooden Chairs; and No. 85, Adhesive Plaster, have been reaffirmed by their respective industries for another year. Copies of the printed pamphlets covering

these programs may be secured for 5 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

### BUREAU STUDIES BEHAVIOR OF GASOLINE IN IDEAL ENGINE MANIFOLD

When gasoline is sprayed through the carburetor jet into the intake manifold of an automobile engine, it evaporates, explains the bureau, as it is carried along with the air stream into the cylinders. The resulting mixture must contain air and gasoline vapor in explosive proportions if the engine is to start when a spark is passed through the mixture in the cylinder and keep on running after it once has started.

The ease of starting and the amount of power developed by the engine will depend upon how rich or how lean an air-vapor mixture is formed. The carburetor may be adjusted, to give equally rich mixtures with gasolines of different volatility, but if the carburetor adjustment is left unchanged a more volatile gasoline will tend to form a richer mixture. Not only does the volatility of the gasoline effect the mixture of air and vapor formed, but with any fixed carburetor setting and any particular gasoline, the richness of the mixture will depend upon the length of the manifold and its general design.

Since vaporization of gasoline in the intake air stream does depend upon manifold design, the bureau, in studying the measurement of gasoline volatility, began with an almost ideal type of manifold. While this type of manifold is so nearly ideal that it would be impracticable to use it on an actual engine, the results obtained with it furnish a standard of reference for evaluating how closely vaporization in different kinds of actual manifolds follows that obtained in the ideal system. The results of three years of work show conclusively that the distillation test used by the oil refiners is adequate to give the desired information on volatility under equilibrium conditions. Of course, this basic information must be supplemented by a study of the differences between vaporization in an ideal manifold and in the various types of manifolds in use in cars at this time.

### MANY ACCEPTANCES TO SIMPLIFICATIONS AND COMMERCIAL STANDARDS

Total of 21,488 Individuals and 1,254 Associations Have Accepted Simplified Practice Recommendations; 1,758 Acceptances Received for Commercial Standards

Indicative of the support and interest of American business in the simplification and commercial standards programs developed as a medium of eliminating avoidable waste in industry, the assistant director of the bureau, in charge of the commercial standardization group, has announced that a total of 21,488 individual and 1,254 associational acceptances have been received for the 114 simplified practice recommendations thus far developed by industry under the auspices of the division of simplified practice of the bureau.

It was also stated that a total of 1,758 acceptances have been received for the 12 commercial standards that have been developed under the auspices of the division of trade standards.

In addition to the programs already in effect, various industries have submitted 11 additional sim-

plification and 7 commercial standardization programs to the bureau. The division of simplified practice now has 100 active proposals under consideration and the division of trade standards 41.

### BASIC BOOK FOR PRINTERS

Chapter II of the book, The Standard Book on Estimating, by Fred W. Hoch, of the New York Employing Printers Association, dealing with the subject of paper, standard sizes, comparative weights of odd size sheets and samples of paper, should prove of interest to acceptors of simplified practice recommendation No. 22, Paper. The book has the approval of the United Typothetae of America committee on education, as a book of the typothetae management series.

### BLUE-PRINT PAPER SIMPLIFICATION PROPOSED

At the request of the simplification committee of the International Association of Blue Print and Allied Industries, the division of simplified practice is making a survey of current variety of blue print paper. The information collected by the division will be used as the basis for developing a simplified practice recommendation.

### STANDARD SYSTEM OF AIRWAYS MARKING HELD TO BE VITAL NEED OF FLIERS

**Uniform and Simple Emblems Urged as Guides by Department of Commerce**

The general adoption of a standard system of airways marking, so that flyers can obtain necessary information in the simplest and most effective manner, is one of the most vital needs of air navigation at the present time, according to the aeronautics branch of the Department of Commerce.

It is essential that every city, town, and hamlet be adequately air marked, it is stated by the department, and to secure uniformity in this work a standard system has been outlined. The committee which drafted these recommendations included representatives of the Bureau of Aeronautics, of the Navy Department, the Army Air Corps, the National Airway Marking Association, and the aeronautics branch of the Department of Commerce. The markings should be as simple as possible consistent with the information to be conveyed; should be of such size and color as to insure maximum attractive power and visibility under all atmospheric conditions; should be easily legible from an average altitude of flight, and should be so illuminated as to be equally as effective by night as by day.

### SIMPLIFYING RESTAURANT GUEST CHECKS

A general conference of representatives of manufacturers, distributors, and users of restaurant guest checks last month approved a simplified practice recommendation for checks used by restaurants, cafés, and dining rooms. The program which was prepared by a committee of manufacturers, applies to written checks only and does not include the type known as punch checks.

The program includes a description of the cardboard and paper to be used in the manufacture of checks, as well as the sizes, colors of ink, numbering,

binding, and packaging of finished checks. The recommendation will reduce the current grades of cardboard checks from 4 to 3 and paper checks from 7 to 4; widths of cardboard checks from 12 to 5 and lengths from 16 to 4; widths of paper checks from 10 to 8. The varieties retained will, in the opinion of the industry, satisfy the normal requirements of the trade.

The conference approved the appointment of a standing committee to consist of representatives of manufacturers, distributors, and users for the purpose of enlisting the support of all concerned to maintain interest and adherence by keeping the program abreast of current practice through periodic revision. The conference established January 1, 1930, as the effective date for the recommendation.

### RESEARCH BUREAU FORMED BY SCRAP IRON AND STEEL INSTITUTE

The Scrap Iron and Steel Institute is reported to have recently created a research bureau to survey conditions in the scrap iron and steel industry. It is proposed to study thoroughly every phase of direct dealing between producers and consumers of scrap. It is stated that the principle of reciprocity in the sale of finished steel products and the purchase of scrap, and its effect on the steel industry, will probably be included. It is announced that when the survey is completed the results will be placed at the disposal of producers, consumers, and all agencies concerned with the industry.

### MEMORIES OF THE PAST

The artist who drew the front cover of the General Electric News for August, 1929, tried to bring out an idea that has recently been attracting the attention of all of us, namely, that it is very old fashioned to be wasteful. Excessive waste, the artist felt, will soon be considered quite as obsolete and absurd as gas lights, side burns, and the horse and buggy as a means of getting around. Let us all hope he is a good prophet and that the days of excessive waste will soon be nothing but memories. The front cover of the General Electric News has a red background with pictures sketched in white. The pictures represent the old fashioned buggy, gas light, side burns, spinning wheel, high-wheel bicycle, and in the center is the well-known waste can.

### BEVERAGE INDUSTRY SEEKS TO SIMPLIFY SIZES OF BOTTLES

**Great Savings Are Expected to Result from Adoption of Committee Recommendations**

Great savings are expected to result from the adoption of recommendations which are to be presented by a simplified practice committee at a general conference on the simplification of sizes of bottles used by the carbonated-beverage industry. This conference will be conducted under the auspices of the division of simplified practice.

The conference will be comprised of representative manufacturers, distributors, and purchasers of carbonated beverages, bottling machinery, bottle caps, bottle boxes, bottle labels, crates, and cartons, and will be held in Atlantic City, N. J.

At the present time there are several hundred varieties of bottles used in the carbonated-beverage industry, which accounts for a great deal of economic waste and also much inconvenience, states the committee in charge of the proposed program. The recommendations of the committee completely cover standard capacities, heights, diameters, and weight of glass for bottles used by the industry.

#### Membership of committee.

The joint simplified practice committee of the American Bottlers of Carbonated Beverages and the Glass Container Association, which has prepared the recommendations, includes the following: James Vernor, jr., James Vernor Co., Detroit (chairman); Charles E. Culpeper, the Coca-Cola Bottling Co. of New York (Inc.); J. P. Curran, American Bottling Co.; F. L. Lloyd, Crown Cork & Seal Co.; W. S. Richards, Illinois Glass Co. (representing standardization committee of Glass Container Association); W. R. Root, of the Root Glass Co.; Junior Owens, secretary of the American Bottlers of Carbonated Beverages; L. S. Cunningham, jr., of the D. O. Cunningham Glass Co.; and Carl A. Jones, president of the American Bottlers of Carbonated Beverages.

The general conference is expected to establish an effective date for production on the basis of the new schedule, after it has been approved by the industry, and will designate a transitional period during which eliminated varieties may be moved into consumption without injuring any element in the industry. A standing committee also will be appointed to control the new recommendation.

#### UNIFORMITY IS SOUGHT IN TYPES OF TRUNKS

**Conference Scheduled This Month to Consider Reduction in Number of Sizes**

At a meeting held in New York on August 16, attended by manufacturers and dealers as well as representatives of the Pullman Co., the American Association of Baggage Agents, the National Retail Dry Goods Association, and others, a resolution was approved authorizing the appointment of a joint committee to prepare a tentative recommendation for luggage sizes for the use of the division of simplified practice, in arranging for a general conference to be held in conjunction with the November convention of the Trunk, Luggage, and Leather Goods Manufacturers of America.

It is the belief of some of the manufacturers that the adoption of standard sizes for trunks and hand luggage will result in a considerable reduction in investment in boxes used in the production of suitcases, etc. One manufacturer stated that "if standard sizes could be adopted he could reduce his inventory by \$5,000 on boxes used in the manufacture of a line of ladies' merchandise. If this is true in one factory, the total saving for all manufacturers would be considerable. It is felt also by dealers that standardization of sizes will increase turnover and make it possible to have their orders filled promptly.

The baggage agents of the various railroads and steamship companies claim the standardization of luggage sizes will help tremendously in the expeditious handling of luggage. According to the chairman of

the committee on standardization of baggage, of the American Association of Baggage Agents, the railroads have for a long time felt the need for uniformity in sizes of baggage. The National Retail Dry Goods Association, the National Association of Retail Clothiers and Furnishers, and the Pullman Co., are likewise very much in favor of the standardization of luggage sizes.

#### INDUSTRIES IN EUROPE PROMOTING UNIFORMITY

**Five Countries Found to Be Active in Promoting Standardization of Goods, Says Harriman**

Testing equipment of the National Bureau of Standards is superior to that maintained by the European Governments, N. F. Harriman, executive chairman of the Federal Purchasing Board, stated recently upon his return from abroad. He has returned from a 3-month tour of Europe, during which he visited the testing laboratories of the leading European countries and also observed the progress of the standardization movement in purchasing methods.

Standardization work in Europe, he said, is carried on as extensively as in the United States. The countries most active in this work are Germany, England, the Netherlands, and Switzerland. In Germany the work has inclined toward dimensional standardization. Purchasing methods also have progressed just as far in Europe as in the United States, he added. Industrial establishments and railways, particularly, are up to the standard of the United States in purchasing methods, he explained.

While in Scotland he visited one of the foremost Diesel engine manufacturers in Europe. This firm, he said, is studying the adaptation of the Diesel engine to aviation.

#### NEW BOOK ON SHEET-METAL WORK

**National Association of Sheet Metal Contractors Publishes Book on Standard Practice in Sheet-Metal Work**

The National Association of Sheet Metal Contractors of the United States, through its trade development committee, announces the publication of a book entitled, "Standard Practice in Sheet Metal Work."

This book contains the standards of recommended practice in fabricating and erecting sheet-metal work for the building industry and covers the following subjects: Roofing; gutters; conductors; flashings and corrugated iron work; skylights and ventilators; metal cornices; metal ceilings; warm-air furnaces; heating and ventilating systems; blow pipe and exhaust systems; fire and Kalamein doors; hollow metal doors and trim; hollow metal windows; restaurant, kitchen, and hotel equipment; and protective coatings and paints.

Members of the National Association of Sheet Metal Contractors of the United States, and representatives of the National Hardware Association of the United States, jointly cooperated, under the auspices of the division of simplified practice, with other interested elements of the industry, in the formulation of simplified practice recommendations for eaves trough, conductor elbows, and fittings; hollow metal doors; and Kalamein doors.

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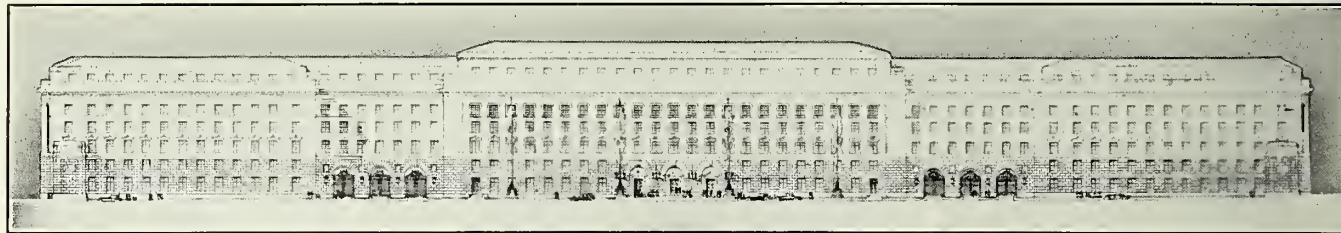
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*—President Hoover, at the laying of the corner stone of the new building  
of the U. S. Department of Commerce, June 10, 1929.*



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The study of the processes of domestic trade and commerce.

### BUREAU OF STANDARDS, GEORGE K. BURGESS, Director.

Custody, development, and construction of standards of measurement, quality, performance, or practice; comparison of standards used by scientific or other institutions; determination of physical constants and properties of materials; researches and tests on materials and processes; and publication of scientific and technical bulletins reporting results of researches and fundamental technical data.

Collection and dissemination of information concerning building codes and the planning and construction of houses.

Establishment of simplified commercial practices through cooperation with business organizations in order to reduce the wastes resulting from excessive variety in commodities.

### BUREAU OF MINES, SCOTT TURNER, Director.

Technical investigations in the mining, preparation, and utilization of minerals, including the study of mine hazards and safety methods and of improved methods in the production and use of minerals.

Testing of Government fuels and management of the Government Fuel Yard at Washington.

Research on helium and operation of plants producing it.

### BUREAU OF MINES—Continued.

Studies in the economics and marketing of minerals and collection of statistics on mineral resources and mine accidents.

The dissemination of results of technical and economic researches in bulletins, technical papers, mineral resources series, miners' circulars, and miscellaneous publications.

### BUREAU OF FISHERIES, HENRY O'MALLEY, Commissioner.

The propagation and distribution of food fish and shellfish, in order to prevent the depletion of the fisheries; investigations to promote conservation of fishery resources; the development of commercial fisheries and agriculture; study of fishery methods, improvements in merchandising, and collection of fishery statistics; administration of Alaska fisheries and fur seals; and the protection of sponges off the coast of Florida.

### BUREAU OF LIGHTHOUSES, GEORGE R. PUTNAM, Commissioner.

Maintenance of lighthouses and other aids to water navigation. Establishment and maintenance of aids to navigation along civil airways. Publication of Light Lists, Buoy Lists, and Notices to Mariners.

### COAST AND GEODETIC SURVEY, R. S. PATTON, Director.

Survey of the coasts of the United States and publication of charts for the navigation of the adjacent waters, including Alaska, the Philippine Islands, Hawaii, Porto Rico, the Virgin Islands, and the Canal Zone; interior control surveys; magnetic surveys; tide and current observations; and seismological investigations. Publication of results through charts, coast pilots, tide tables, current tables, and special publications.

### BUREAU OF NAVIGATION, ARTHUR J. TYRER, Commissioner.

Superintendence of commercial marine and merchant seamen.

Supervision of registering, enrolling, licensing, numbering, etc., of vessels under the United States flag, and the annual publication of a list of such vessels.

Enforcement of the navigation and steamboat inspection laws, including imposition of fees, fines, tonnage taxes, etc.

### STEAMBOAT INSPECTION SERVICE, DICKERSON N. HOOVER, Supervising Inspector General.

The inspection of merchant vessels, including boilers, hulls, and life-saving equipment, licensing of officers of vessels, certification of able seamen and lifeboat men, and the investigation of violations of steamboat inspection laws.

### UNITED STATES PATENT OFFICE, THOMAS E. ROBERTSON, Commissioner.

The granting of patents and the registration of trade-marks, prints, and labels after technical examination and judicial proceedings.

Maintenance of library with public search room, containing copies of foreign and United States patents and trade-marks. Recording bills of sale, assignments, etc., relating to patents and trade-marks. Furnishing copies of records pertaining to patents. Publication of the weekly Official Gazette, showing the patents and trade-marks issued.

### RADIO DIVISION, W. D. TERRELL, Chief.

Inspection of radio stations on ships; inspection of radio stations on shore, including broadcasting stations; licensing radio operators; assigning station call letters; enforcing the terms of the International Radiotelegraphic Convention; and examining and settling international radio accounts.